T09020"55666860

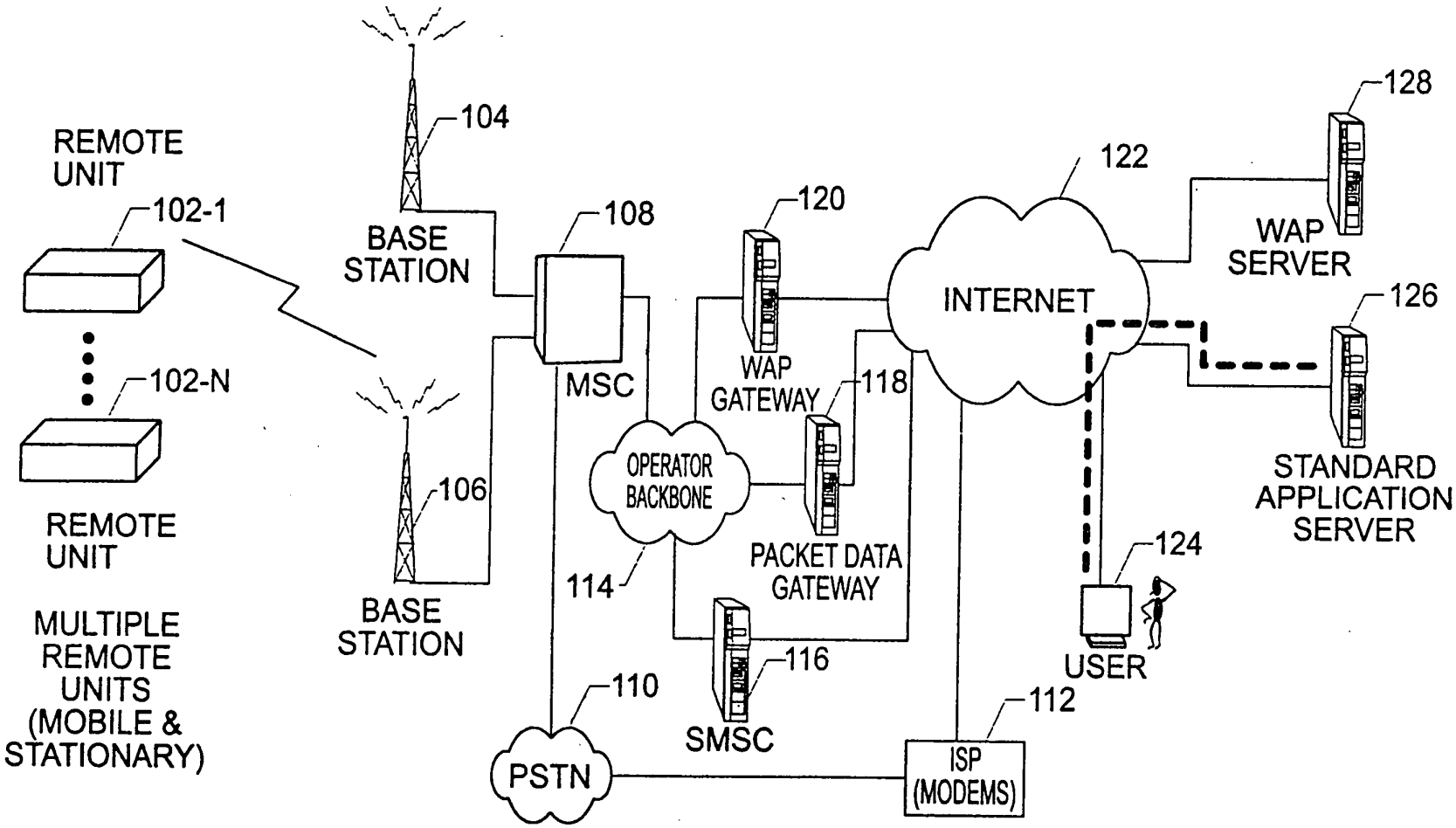

FIG. 1a

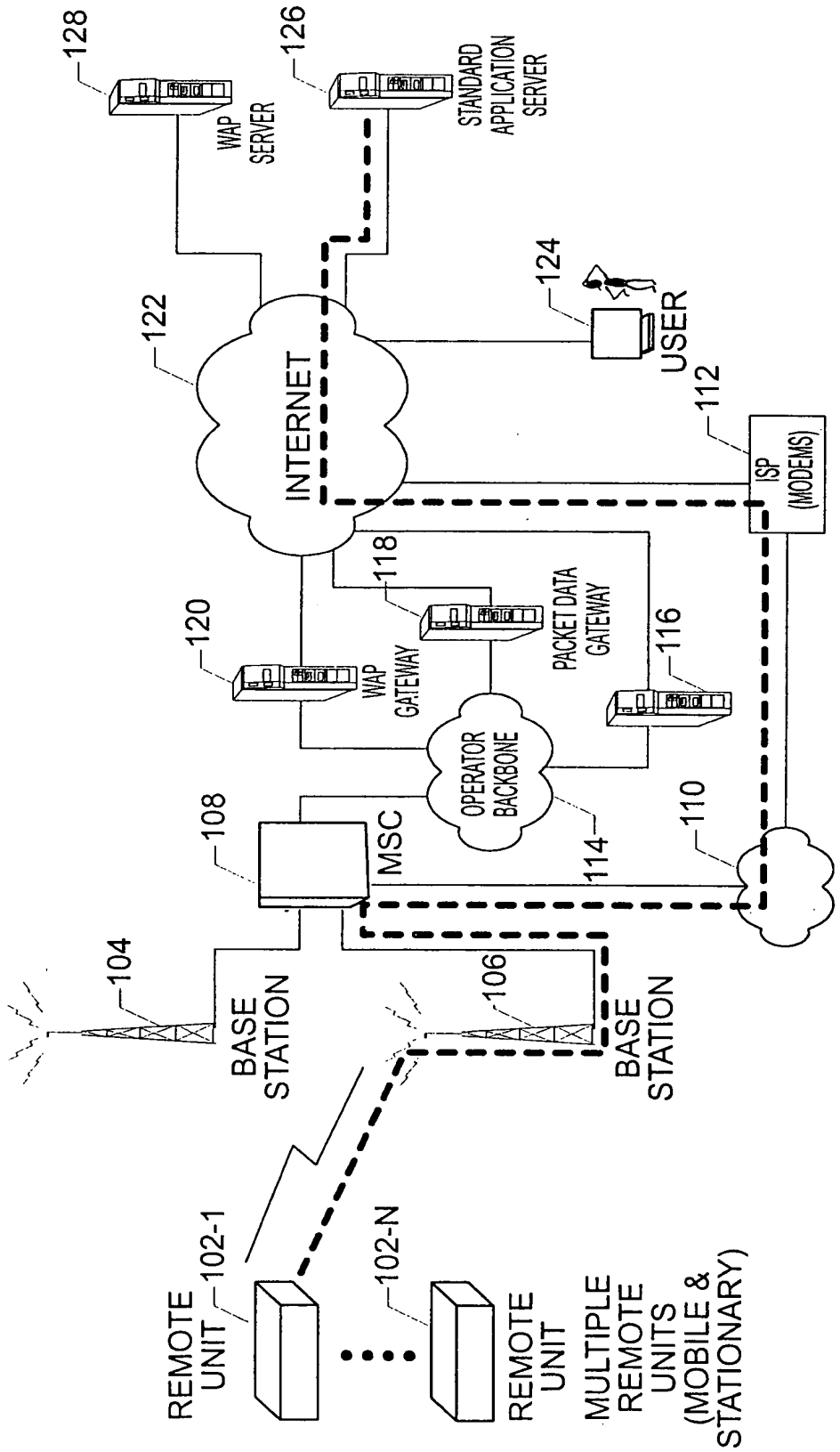

FIG. 1b

T0S0470" 5565860

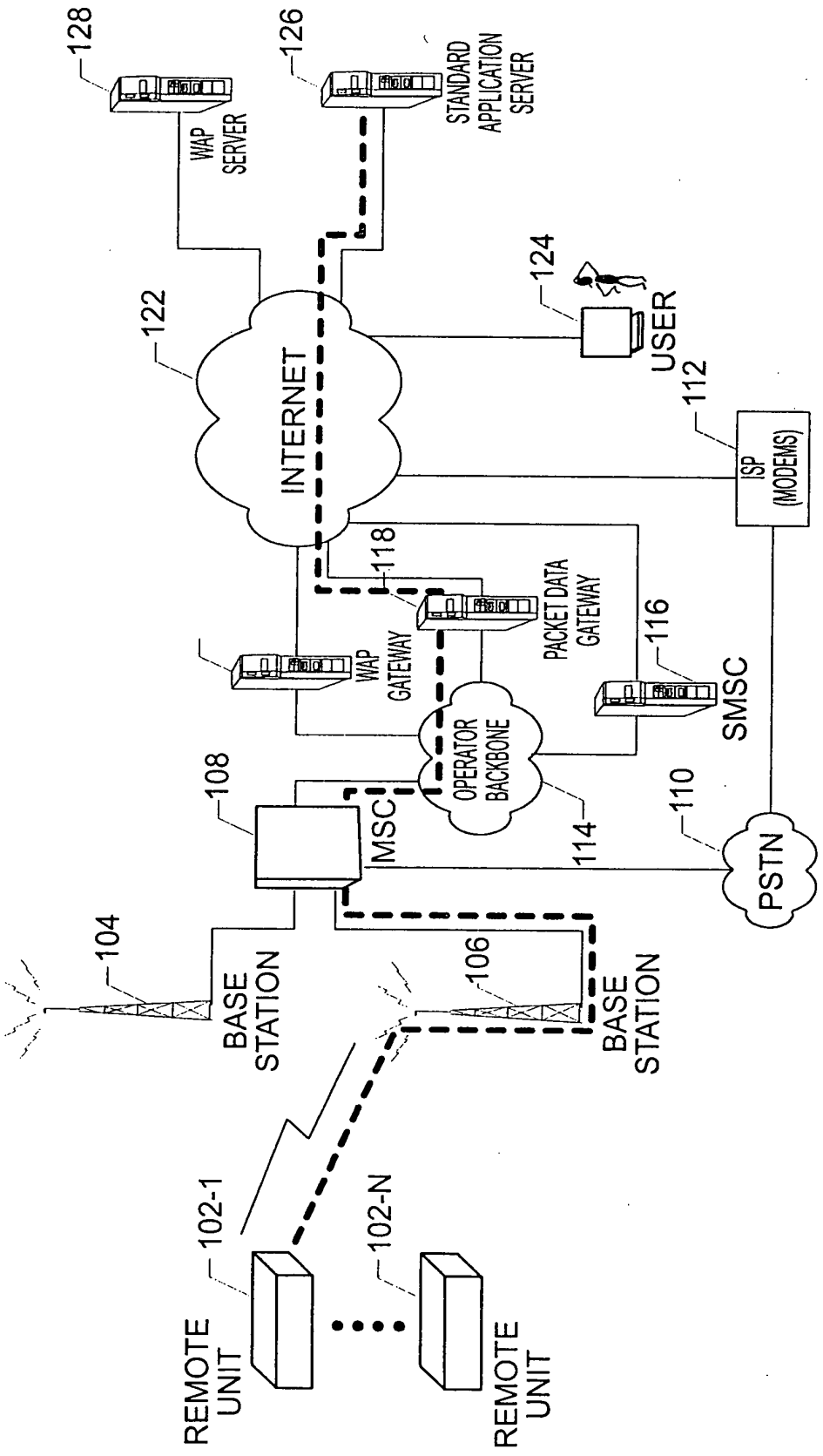
128
WAP SERVER
126
STANDARD APPLICATION SERVER
122
INTERNET
124
USER
112
ISP (MODEMS)
118
PACKET DATA GATEWAY
WAP GATEWAY
116
SMSC
OPERATOR BACKBONE
108
MSC
114
110
PSTN
104
BASE STATION
106
BASE STATION
102-1
102-N
REMOTE UNIT
REMOTE UNIT

FIG. 1c

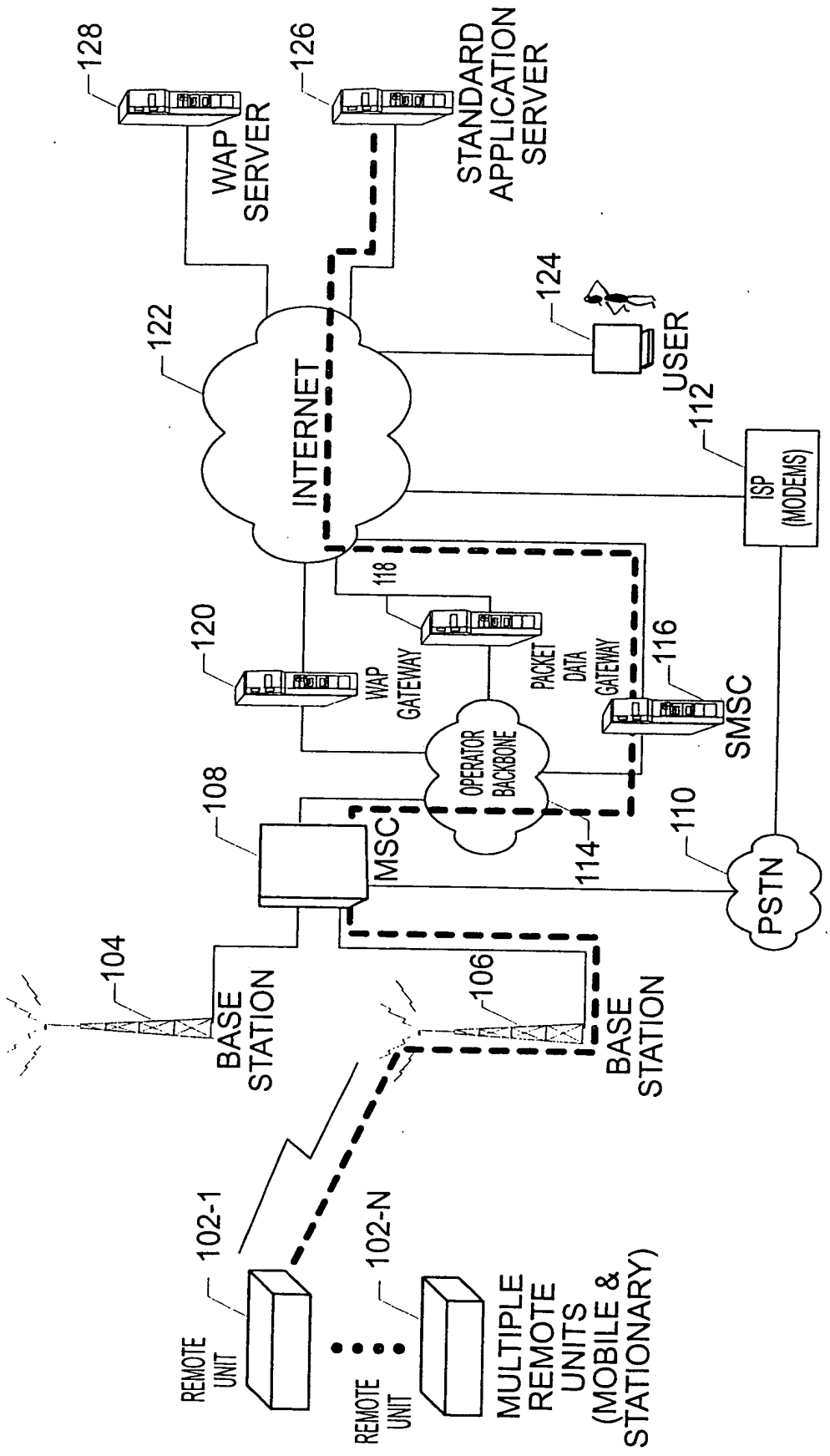
128
WAP SERVER
126
STANDARD APPLICATION SERVER
122
INTERNET
124
USER
112
ISP (MODEMS)
118
120
WAP GATEWAY
PACKET DATA GATEWAY
116
SMSC
OPERATOR BACKBONE
108
MSC
114
110
PSTN
104
BASE STATION
106
BASE STATION
102-1
102-N
REMOTE UNIT
REMOTE UNIT
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)

FIG. 1d

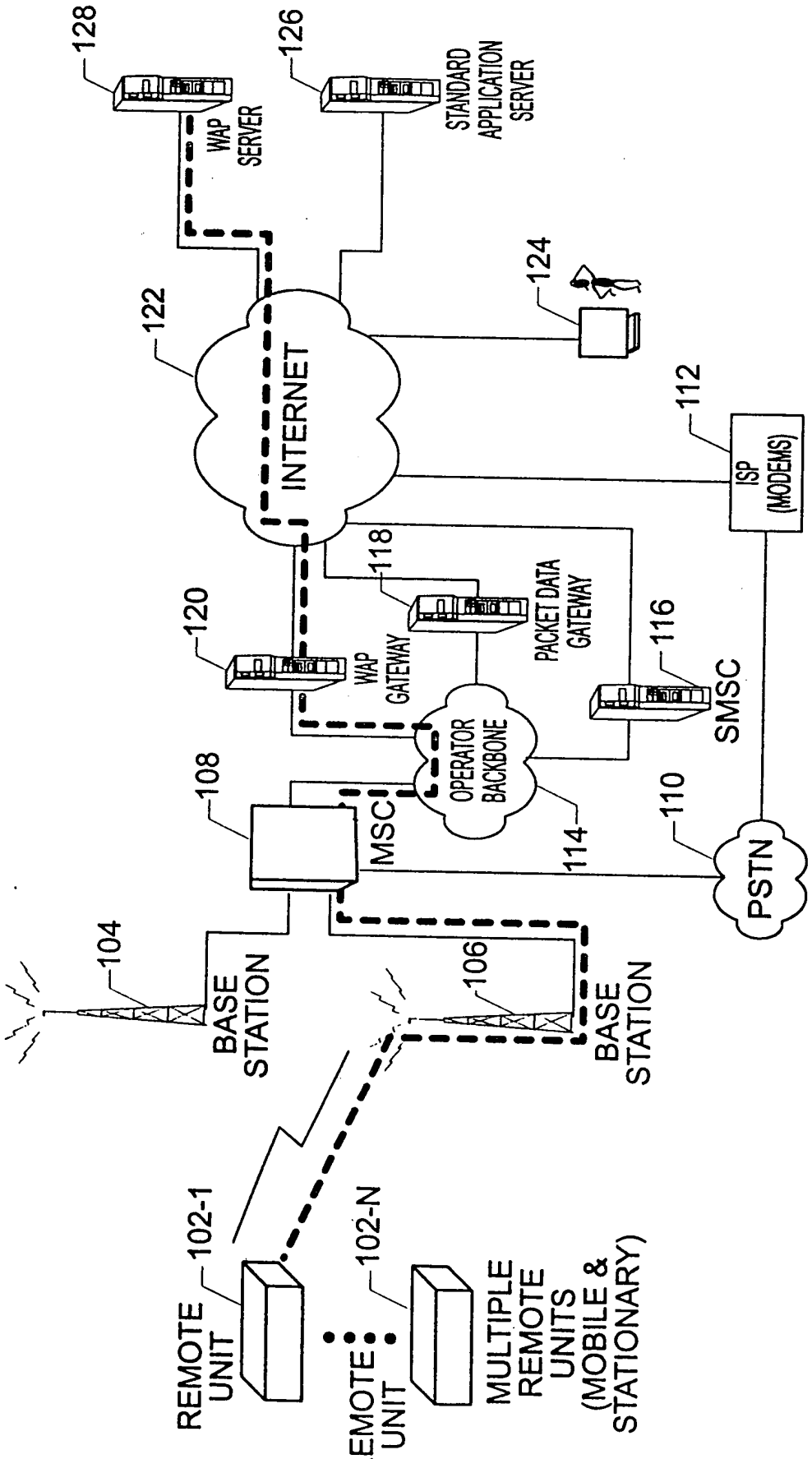

FIG. 1e

T0940" 5566860

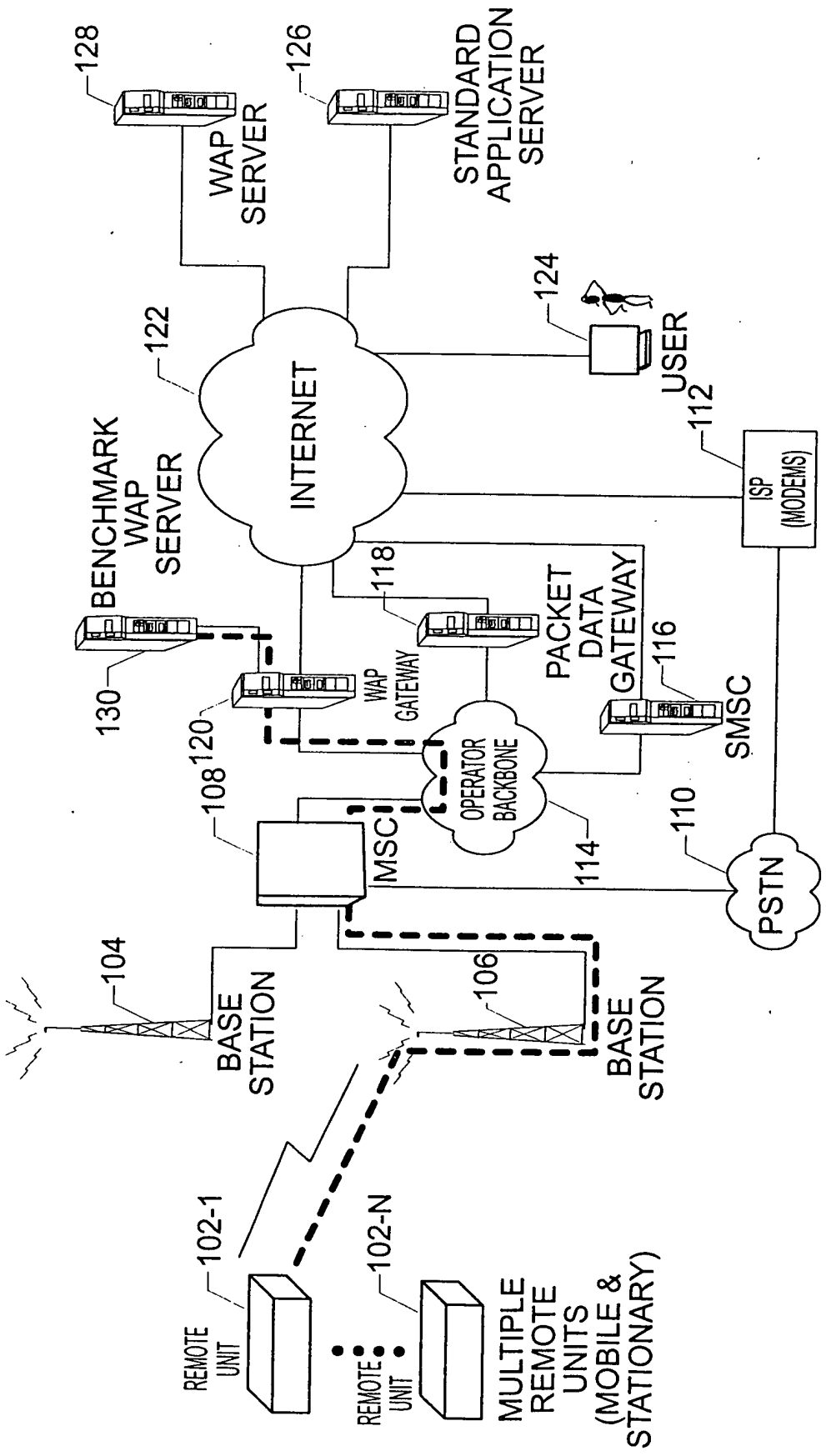
128
WAP SERVER
126
STANDARD APPLICATION SERVER
124
USER
122
INTERNET
112
ISP (MODEMS)
BENCHMARK WAP SERVER
130
118
PACKET DATA GATEWAY
116
SMSC
WAP GATEWAY
120
108
OPERATOR BACKBONE
MSC
114
110
PSTN
104
BASE STATION
106
BASE STATION
102-1
102-N
REMOTE UNIT
REMOTE UNIT
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)

FIG. 1f

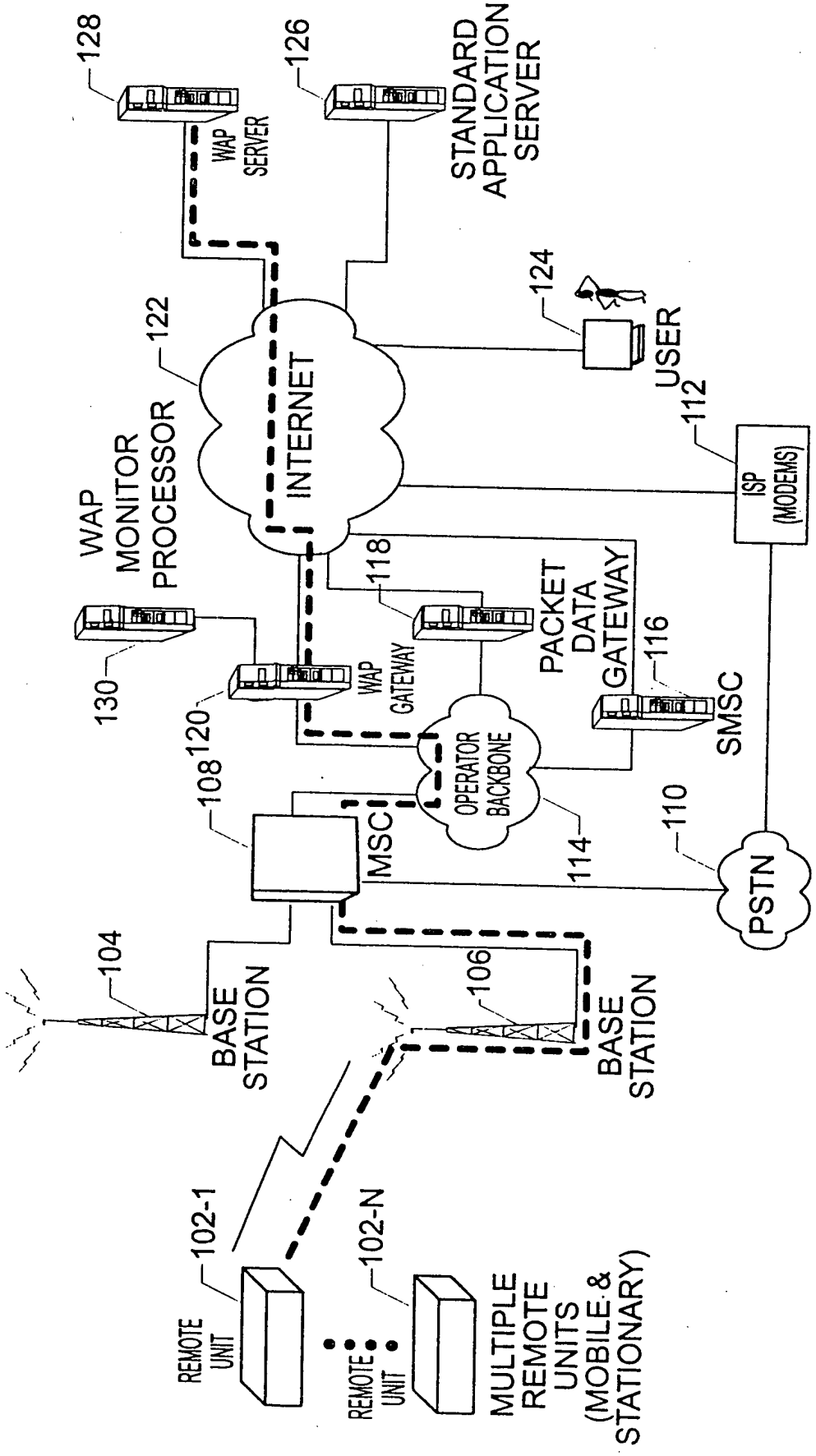
128
WAP SERVER
126
STANDARD APPLICATION SERVER
124
USER
122
INTERNET
WAP MONITOR PROCESSOR
112
ISP (MODEMS)
118
PACKET DATA GATEWAY
116
SMSC
130
120
WAP GATEWAY
OPERATOR BACKBONE
108
MSC
114
110
PSTN
104
BASE STATION
106
BASE STATION
102-1
REMOTE UNIT
102-N
REMOTE UNIT
MULTIPLE REMOTE UNITS (MOBILE & STATIONARY)

FIG. 1g

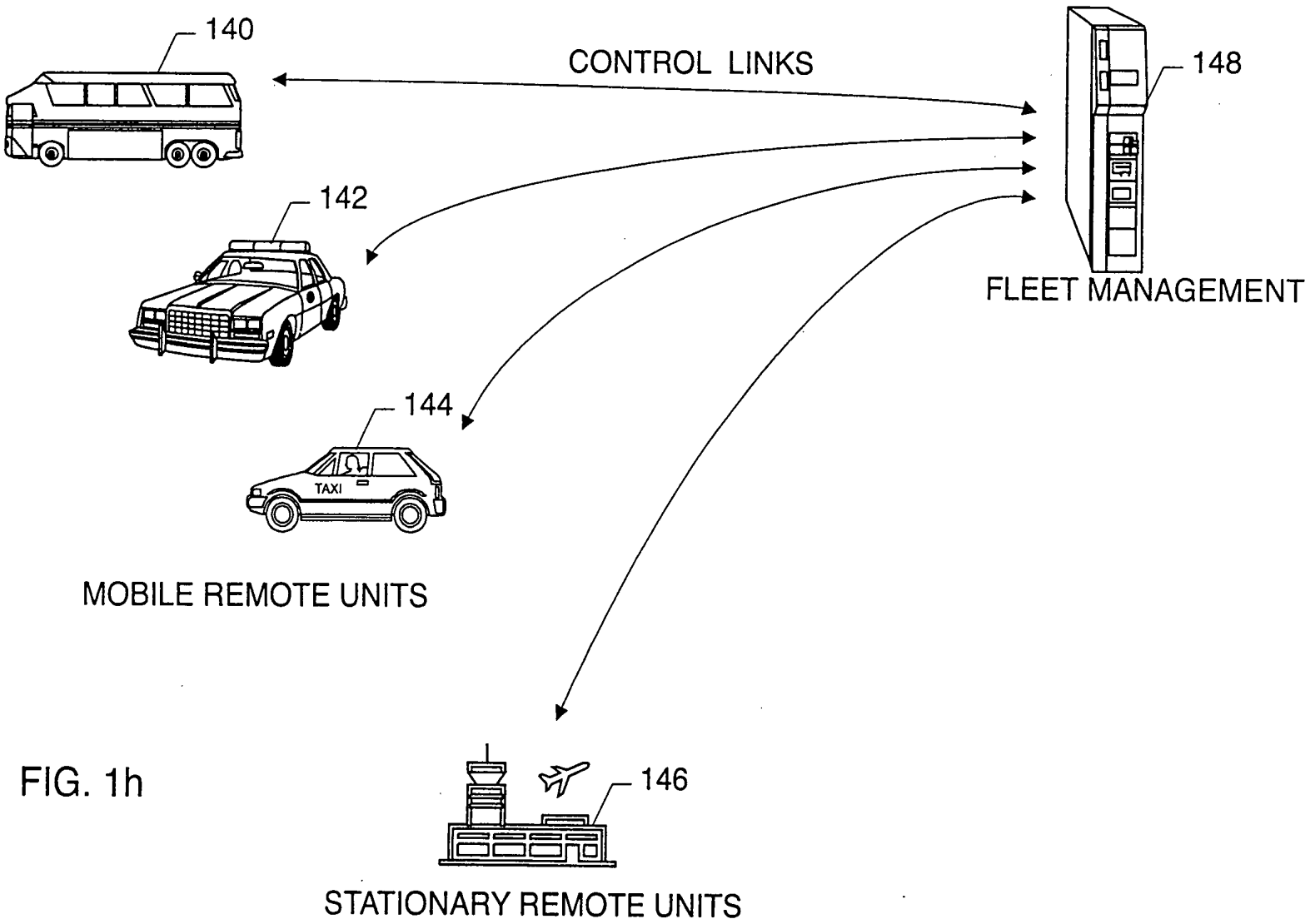
140
CONTROL LINKS
148
142
FLEET MANAGEMENT
144
TAXI
MOBILE REMOTE UNITS
146
STATIONARY REMOTE UNITS

FIG. 1h

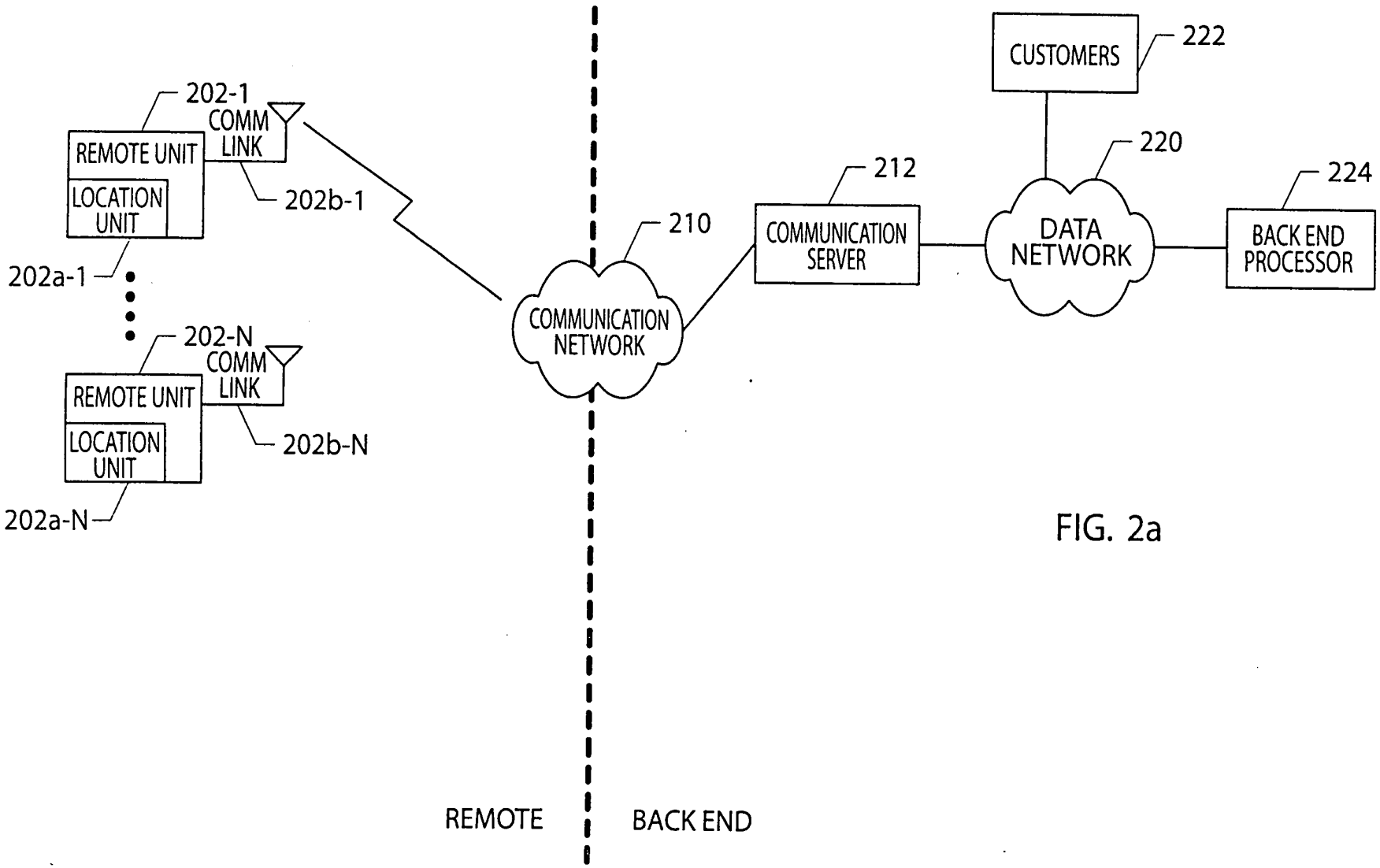
202-1
COMM LINK
REMOTE UNIT
LOCATION UNIT
202b-1
202a-1
202-N
COMM LINK
REMOTE UNIT
LOCATION UNIT
202b-N
202a-N
COMMUNICATION NETWORK
210
COMMUNICATION SERVER
212
CUSTOMERS
222
DATA NETWORK
220
BACK END PROCESSOR
224
REMOTE
BACK END

FIG. 2a

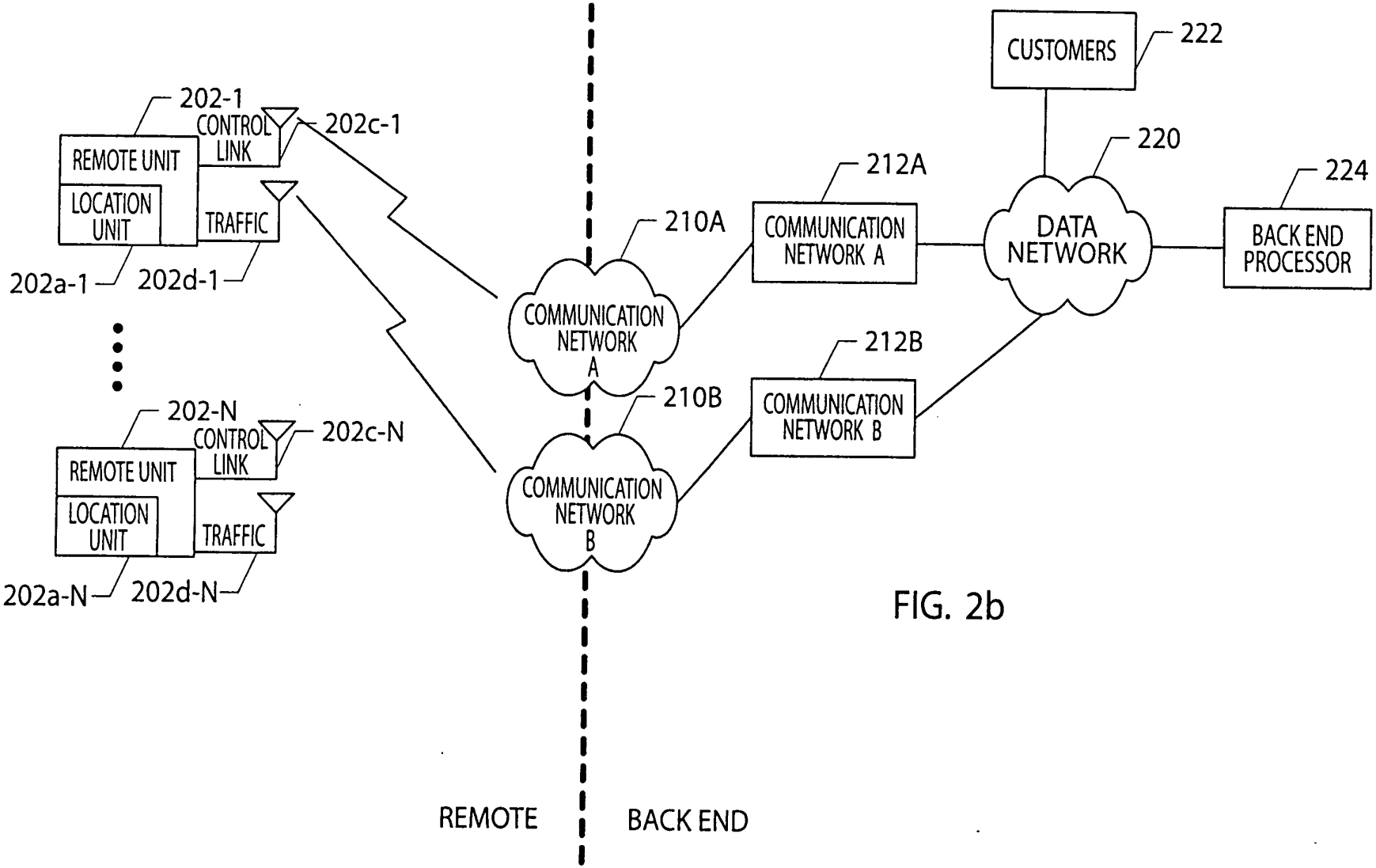
202-1
CONTROL LINK
202c-1
REMOTE UNIT
LOCATION UNIT
TRAFFIC
202a-1
202d-1
202-N
CONTROL LINK
202c-N
REMOTE UNIT
LOCATION UNIT
TRAFFIC
202a-N
202d-N
210A
COMMUNICATION NETWORK A
210B
COMMUNICATION NETWORK B
212A
COMMUNICATION NETWORK A
212B
COMMUNICATION NETWORK B
CUSTOMERS
222
220
DATA NETWORK
224
BACK END PROCESSOR
REMOTE
BACK END

FIG. 2b

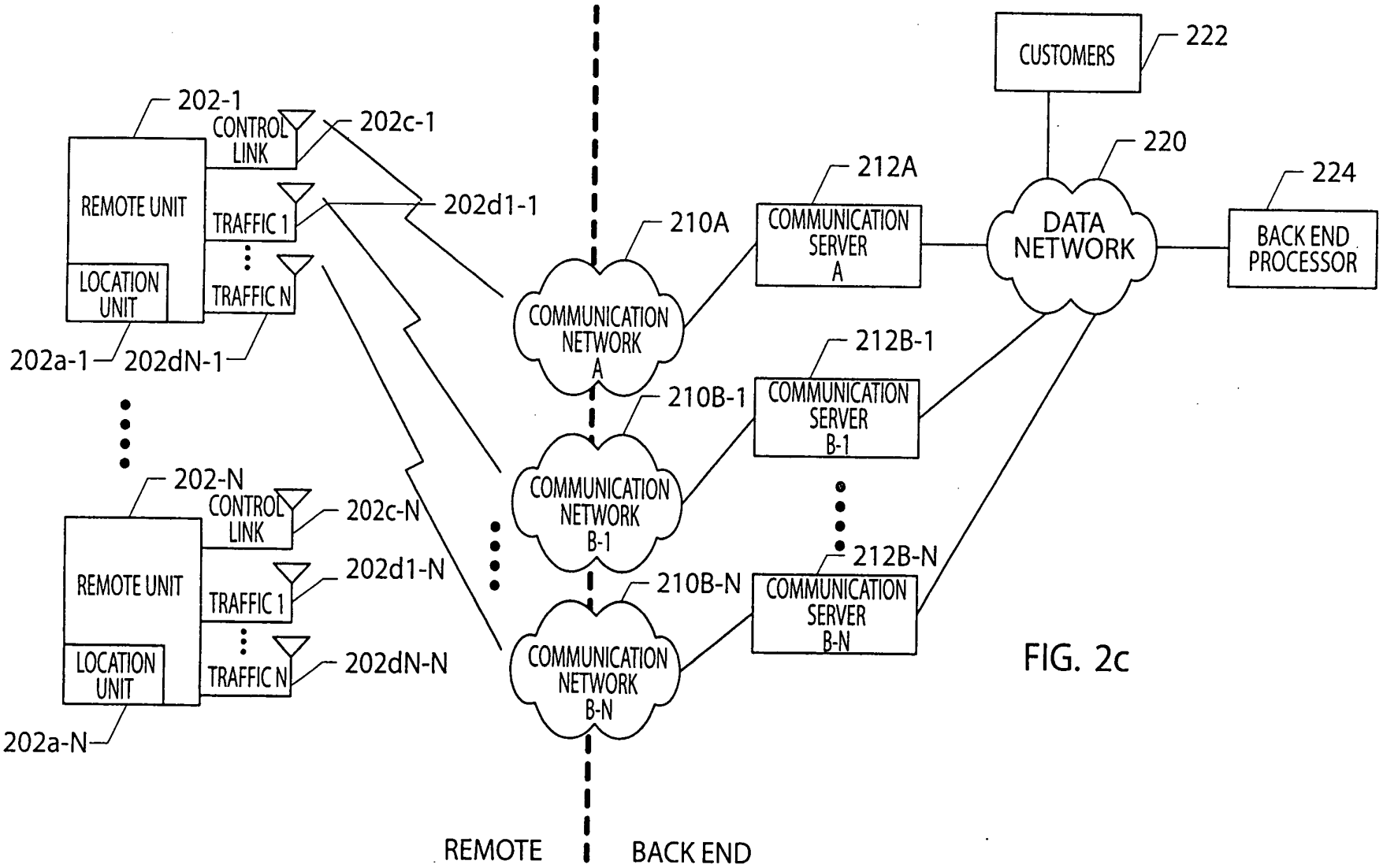
CUSTOMERS
222
220
224
DATA NETWORK
BACK END PROCESSOR
212A
COMMUNICATION SERVER A
210A
COMMUNICATION NETWORK A
212B-1
COMMUNICATION SERVER B-1
210B-1
COMMUNICATION NETWORK B-1
212B-N
COMMUNICATION SERVER B-N
210B-N
COMMUNICATION NETWORK B-N
202-1
REMOTE UNIT
CONTROL LINK
TRAFFIC 1
TRAFFIC N
LOCATION UNIT
202c-1
202d1-1
202a-1
202dN-1
202-N
REMOTE UNIT
CONTROL LINK
TRAFFIC 1
TRAFFIC N
LOCATION UNIT
202c-N
202d1-N
202dN-N
202a-N
REMOTE
BACK END

FIG. 2c

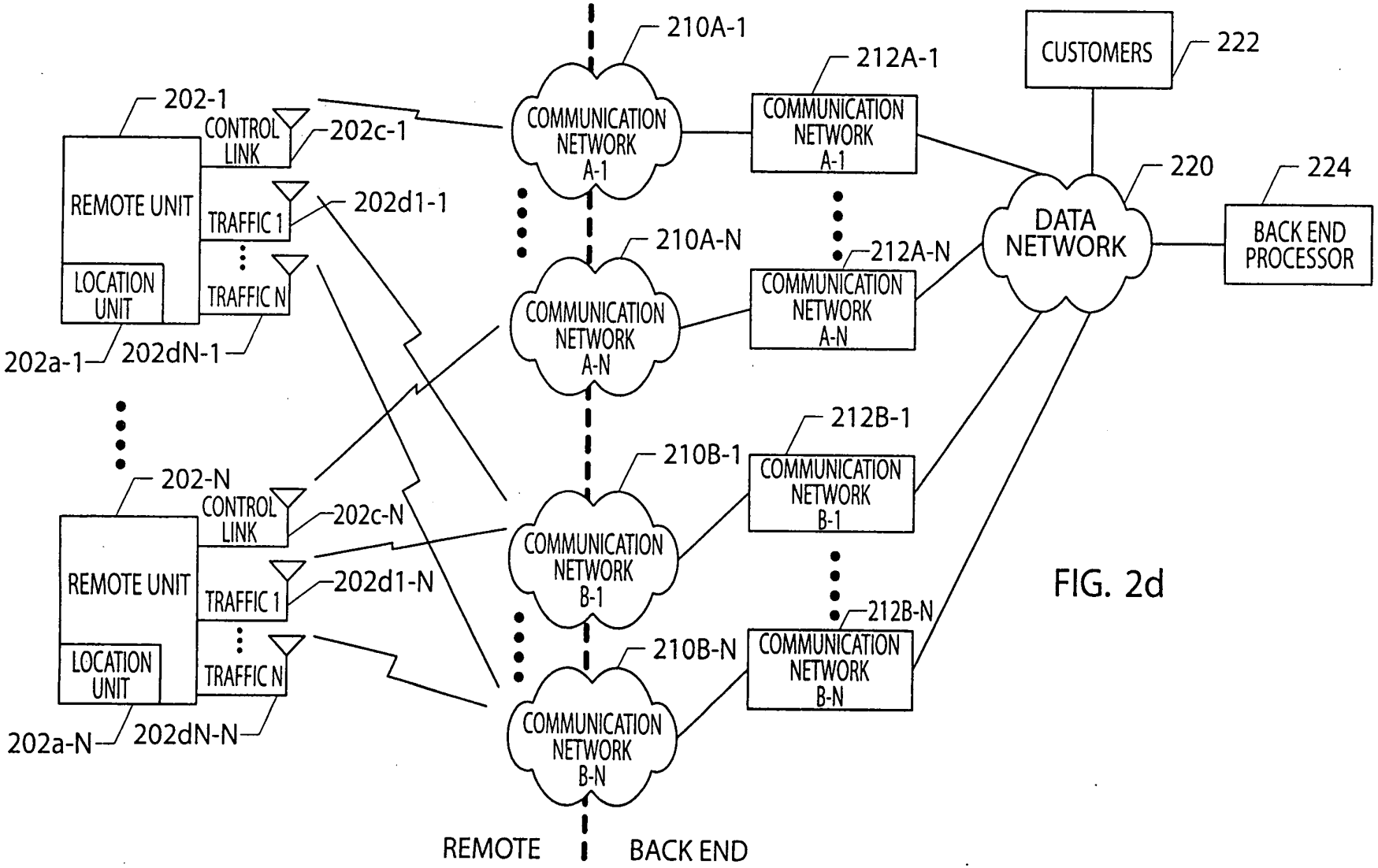
202-1
CONTROL LINK
202c-1
REMOTE UNIT
TRAFFIC 1
202d1-1
LOCATION UNIT
TRAFFIC N
202a-1
202dN-1
202-N
CONTROL LINK
202c-N
REMOTE UNIT
TRAFFIC 1
202d1-N
LOCATION UNIT
TRAFFIC N
202a-N
202dN-N
210A-1
COMMUNICATION NETWORK A-1
210A-N
COMMUNICATION NETWORK A-N
210B-1
COMMUNICATION NETWORK B-1
210B-N
COMMUNICATION NETWORK B-N
212A-1
COMMUNICATION NETWORK A-1
212A-N
COMMUNICATION NETWORK A-N
212B-1
COMMUNICATION NETWORK B-1
212B-N
COMMUNICATION NETWORK B-N
CUSTOMERS
222
220
DATA NETWORK
224
BACK END PROCESSOR
REMOTE
BACK END

FIG. 2d

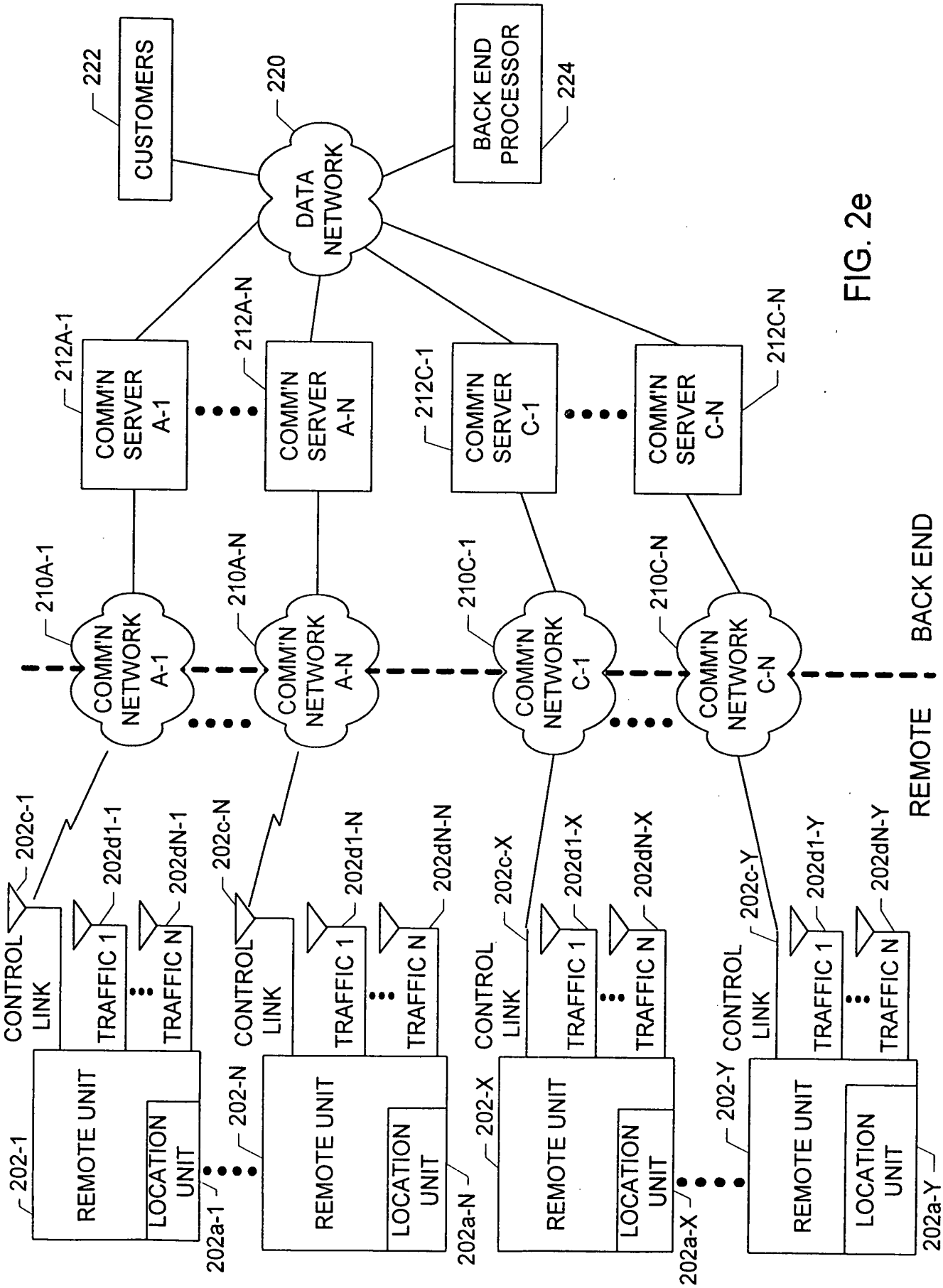
222
CUSTOMERS
220
DATA NETWORK
224
BACK END PROCESSOR
212A-1
COMM'N SERVER A-1
212A-N
COMM'N SERVER A-N
212C-1
COMM'N SERVER C-1
212C-N
COMM'N SERVER C-N
210A-1
COMM'N NETWORK A-1
210A-N
COMM'N NETWORK A-N
210C-1
COMM'N NETWORK C-1
210C-N
COMM'N NETWORK C-N
BACK END
REMOTE
202-1
REMOTE UNIT
LOCATION UNIT
202a-1
202c-1
CONTROL LINK
202d1-1
TRAFFIC 1
202dN-1
TRAFFIC N
202-N
202a-N
202c-N
202d1-N
202dN-N
202-X
202a-X
202c-X
202d1-X
202dN-X
202-Y
202a-Y
202c-Y
202d1-Y
202dN-Y

FIG. 2e

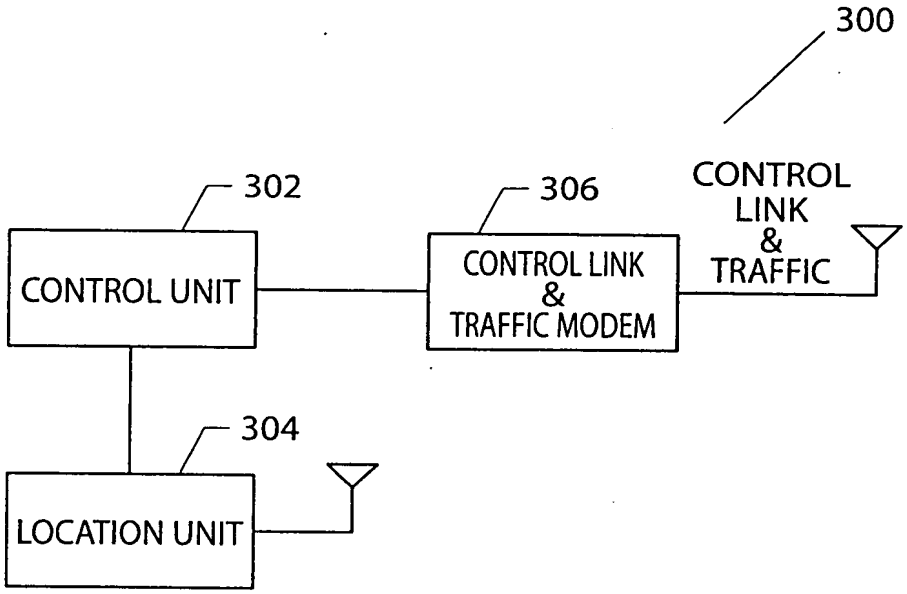

FIG. 3a

0560505.07000

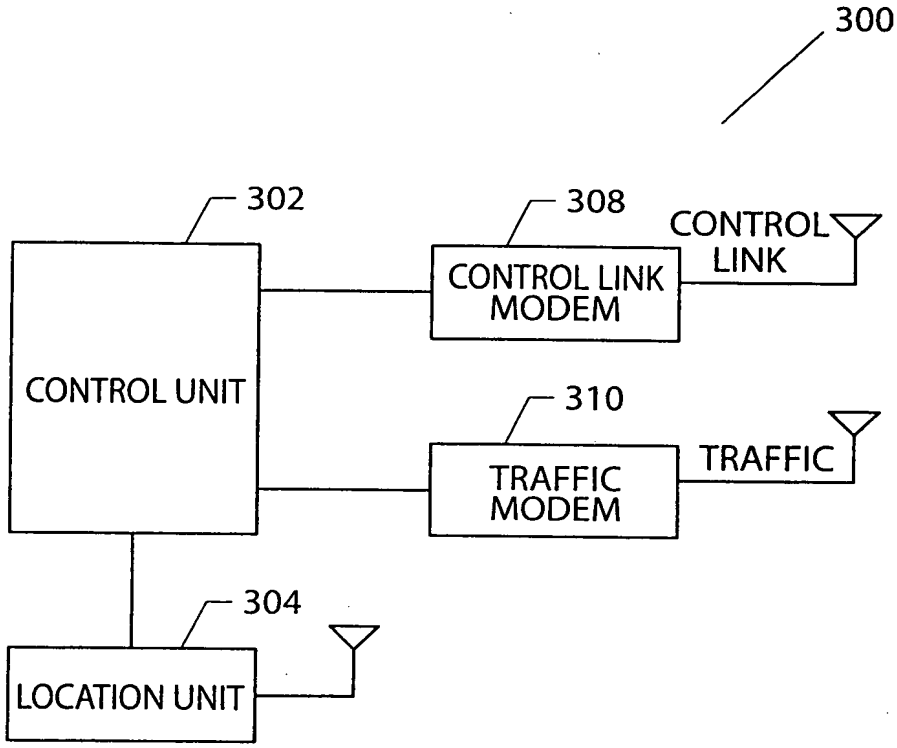

FIG. 3b

WO 99/55105 PCT/US99/08501

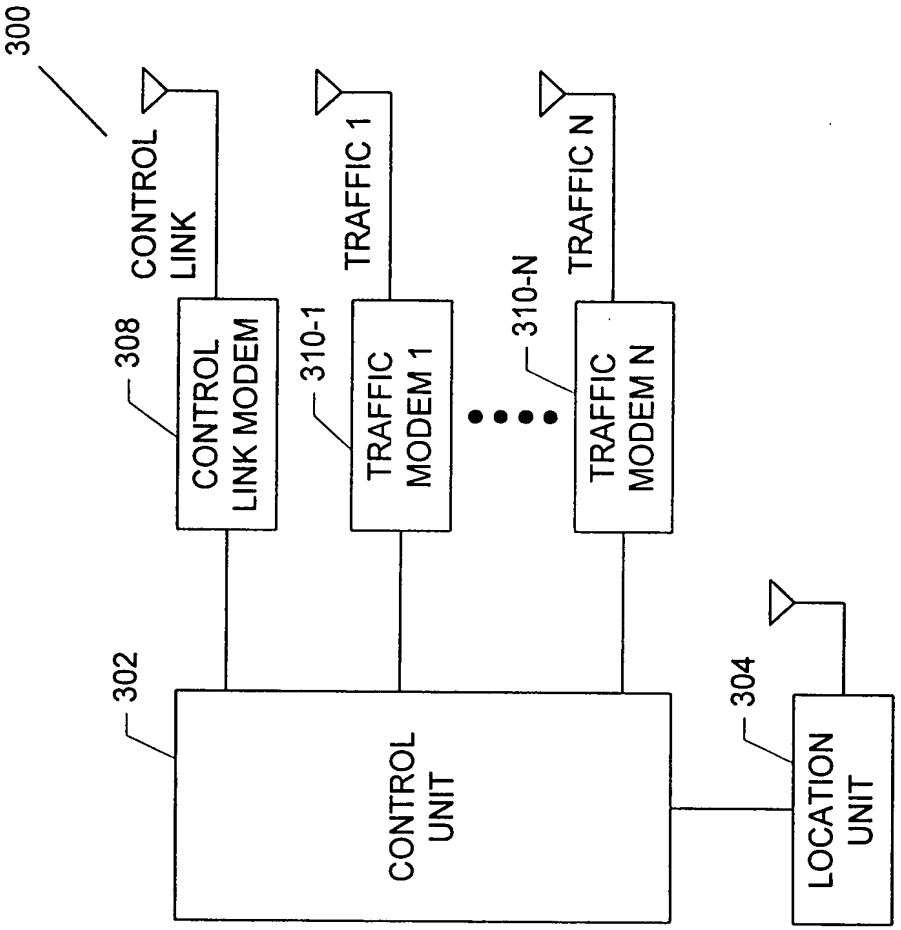
300
CONTROL LINK
TRAFFIC 1
TRAFFIC N
308
310-1
310-N
CONTROL LINK MODEM
TRAFFIC MODEM 1
TRAFFIC MODEM N
302
304
CONTROL UNIT
LOCATION UNIT

FIG. 3c

T0904/0 " 5565860

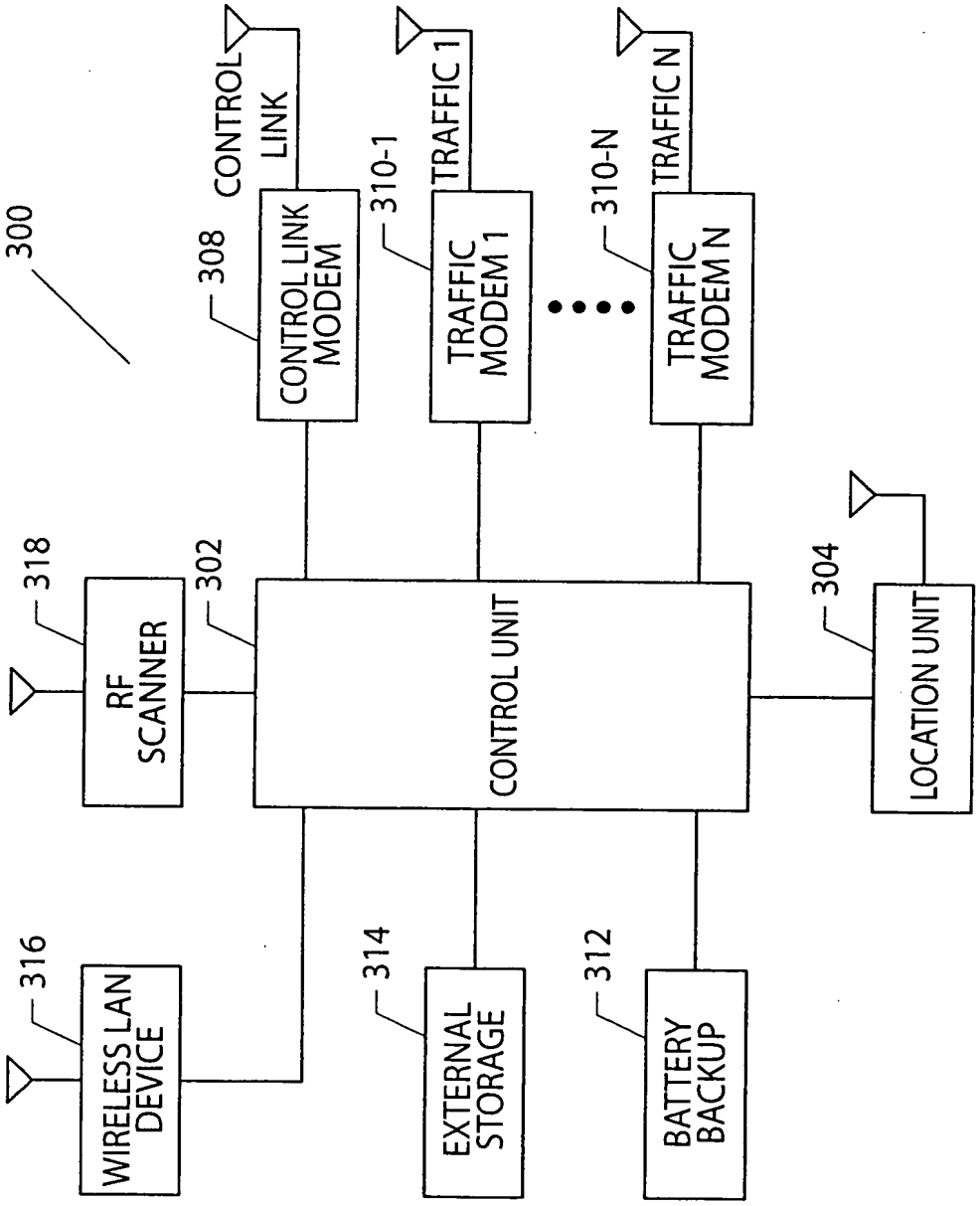

FIG. 3d

TO90/0 "55656850

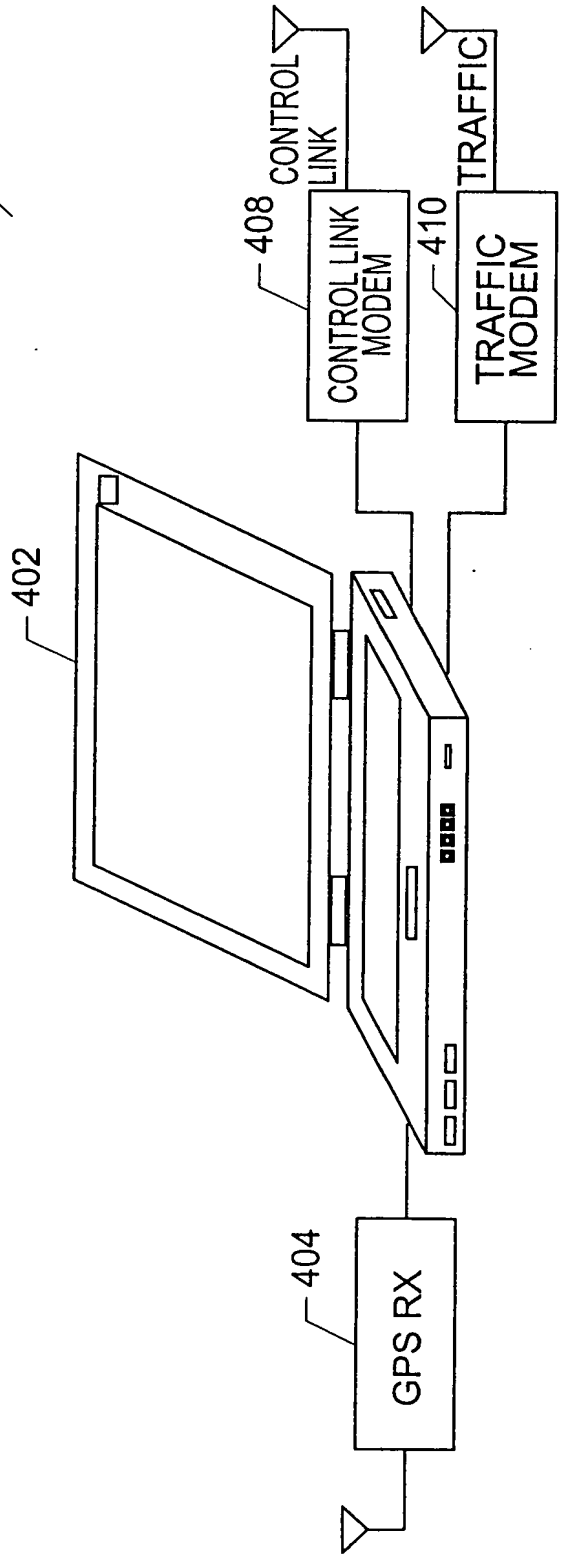

FIG. 4a

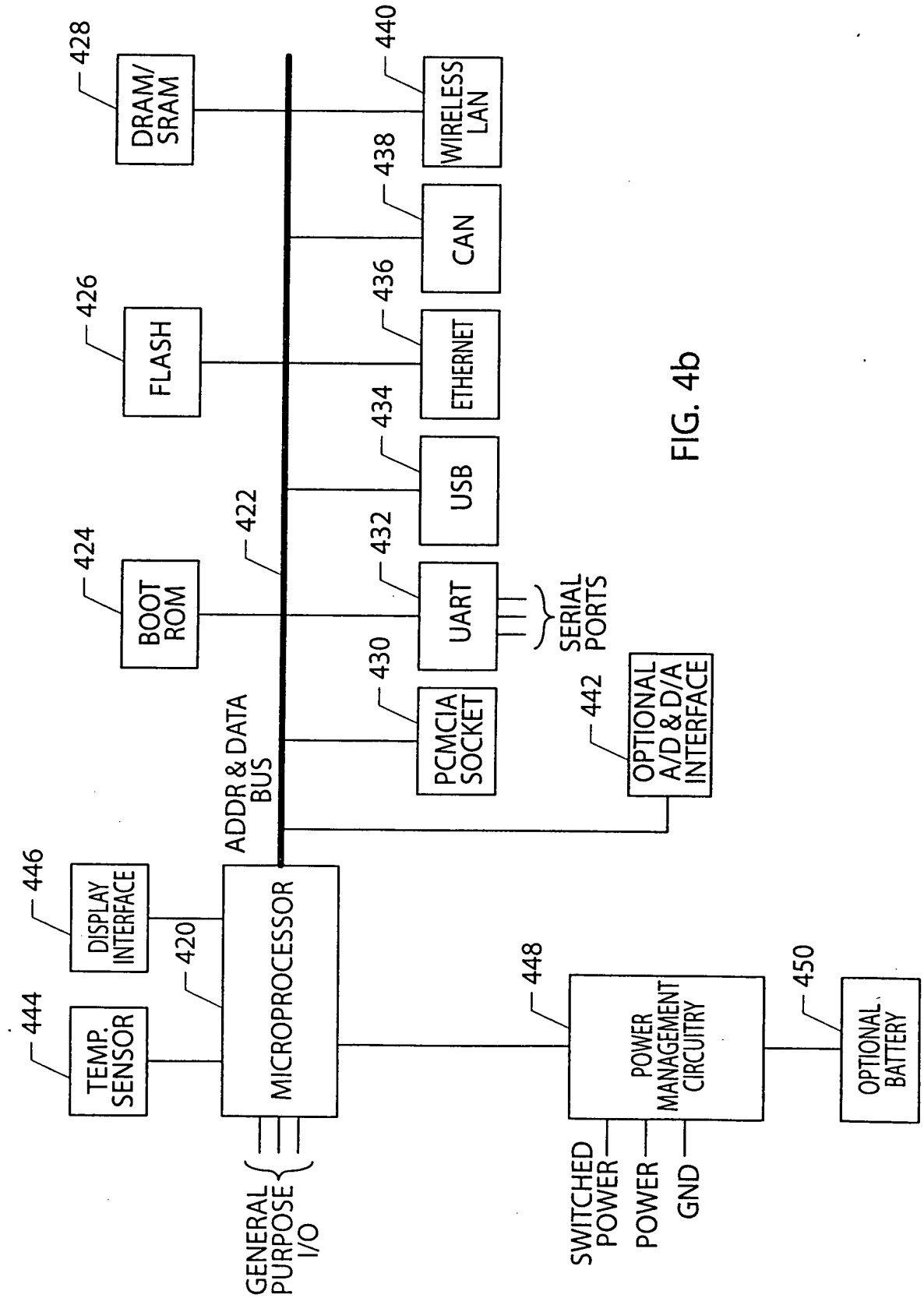
MICROPROCESSOR
420
ADDR & DATA BUS
422
BOOT ROM
424
FLASH
426
DRAM/ SRAM
428
UART
432
SERIAL PORTS
USB
434
ETHERNET
436
CAN
438
WIRELESS LAN
440
PCMCIA SOCKET
430
OPTIONAL A/D & D/A INTERFACE
442
DISPLAY INTERFACE
446
TEMP. SENSOR
444
POWER MANAGEMENT CIRCUITRY
448
OPTIONAL BATTERY
450
GENERAL PURPOSE I/O
SWITCHED POWER
POWER
GND

FIG. 4b

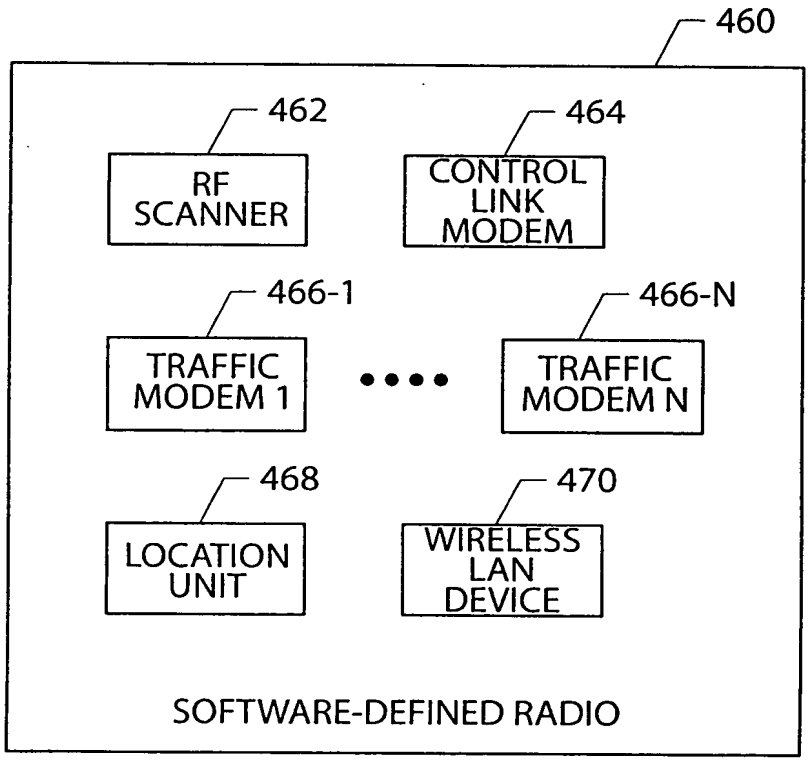

FIG. 4c

WO 2007/056450 PCT/US2006/043950

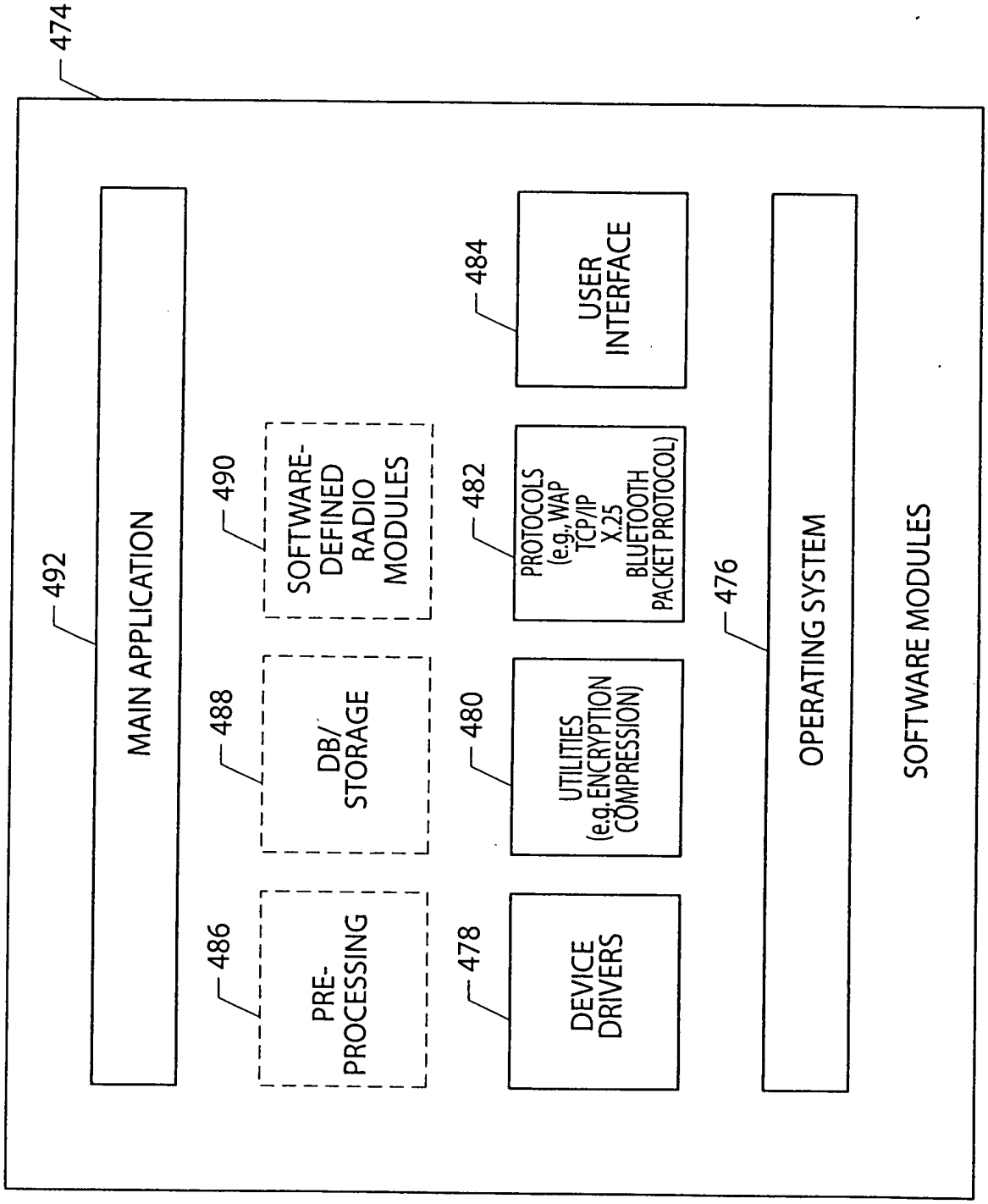
474
SOFTWARE MODULES
492
MAIN APPLICATION
486
PRE-PROCESSING
488
DB/ STORAGE
490
SOFTWARE-DEFINED RADIO MODULES
478
DEVICE DRIVERS
480
UTILITIES (e.g.ENCRYPTION COMPRESSION)
482
PROTOCOLS (e.g.,WAP TCP/IP X.25 BLUETOOTH PACKET PROTOCOL)
476
OPERATING SYSTEM
484
USER INTERFACE

FIG. 4d

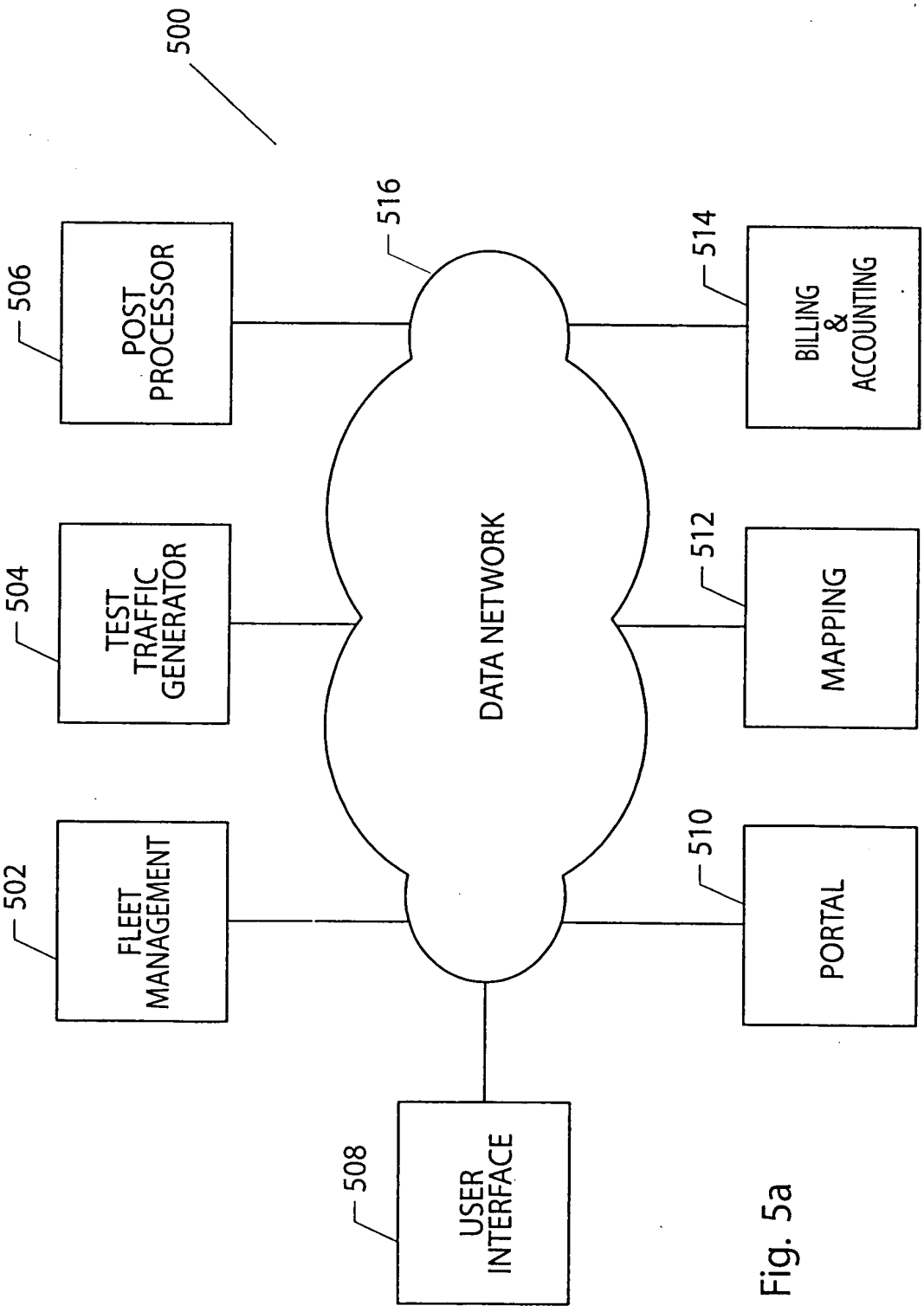
500
516
DATA NETWORK
506
POST PROCESSOR
514
BILLING & ACCOUNTING
504
TEST TRAFFIC GENERATOR
512
MAPPING
502
FLEET MANAGEMENT
510
PORTAL
508
USER INTERFACE

Fig. 5a

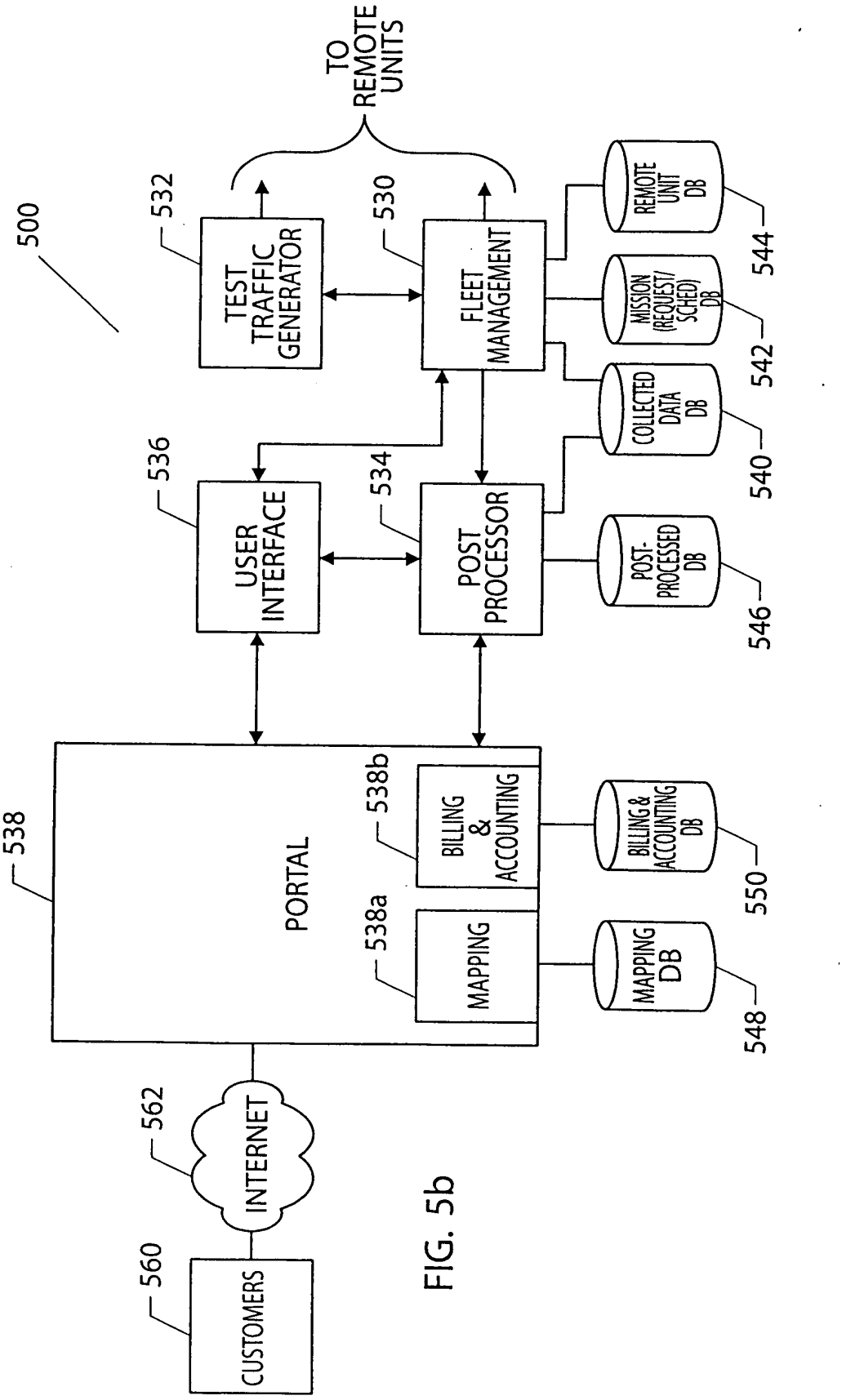
500
TO REMOTE UNITS
532
TEST TRAFFIC GENERATOR
530
FLEET MANAGEMENT
REMOTE UNIT DB
544
MISSION (REQUEST/ SCHED) DB
542
COLLECTED DATA DB
540
536
USER INTERFACE
534
POST PROCESSOR
POST-PROCESSED DB
546
538
PORTAL
538b
BILLING & ACCOUNTING
BILLING & ACCOUNTING DB
550
538a
MAPPING
MAPPING DB
548
562
INTERNET
560
CUSTOMERS

FIG. 5b

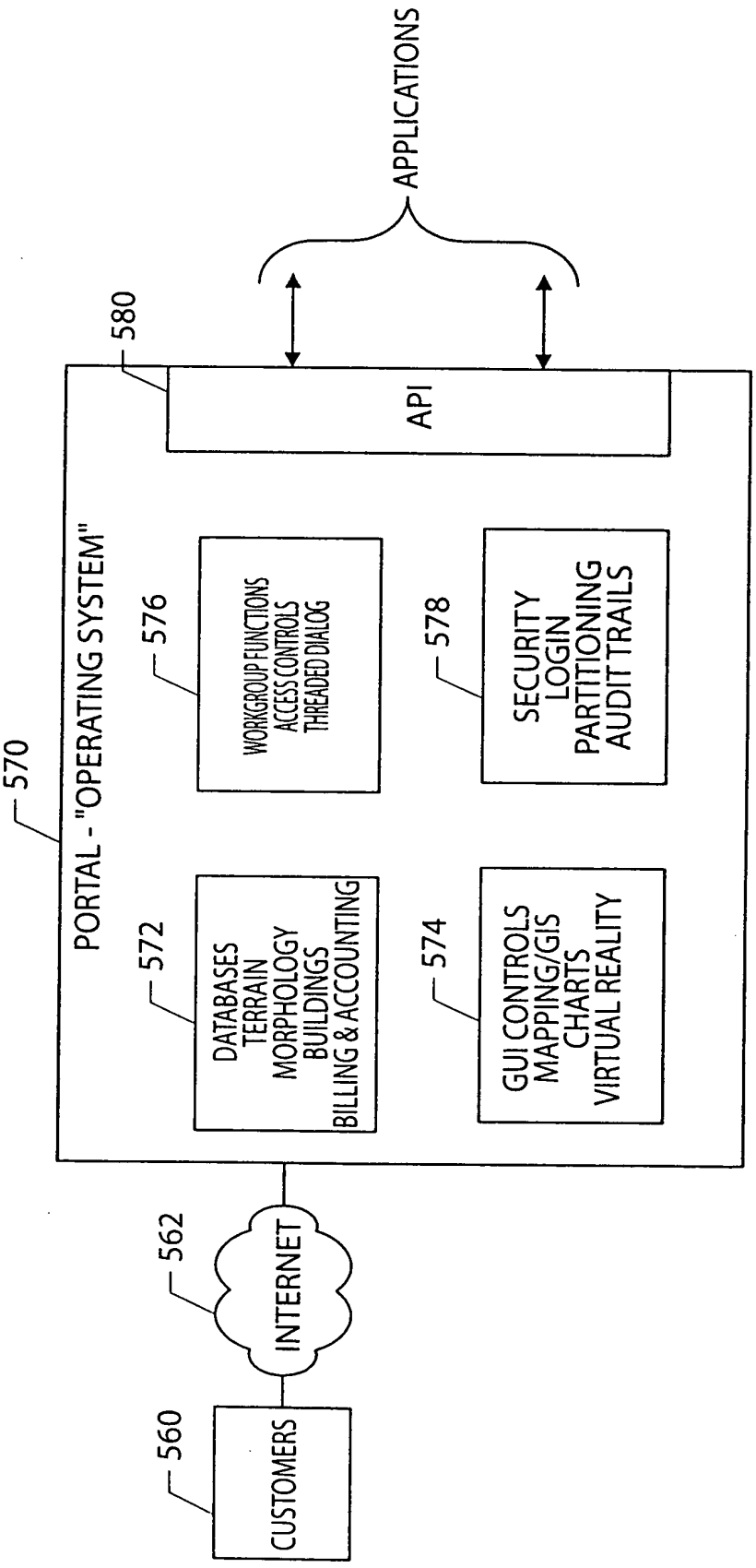

FIG. 5c

T09/470 "5564860

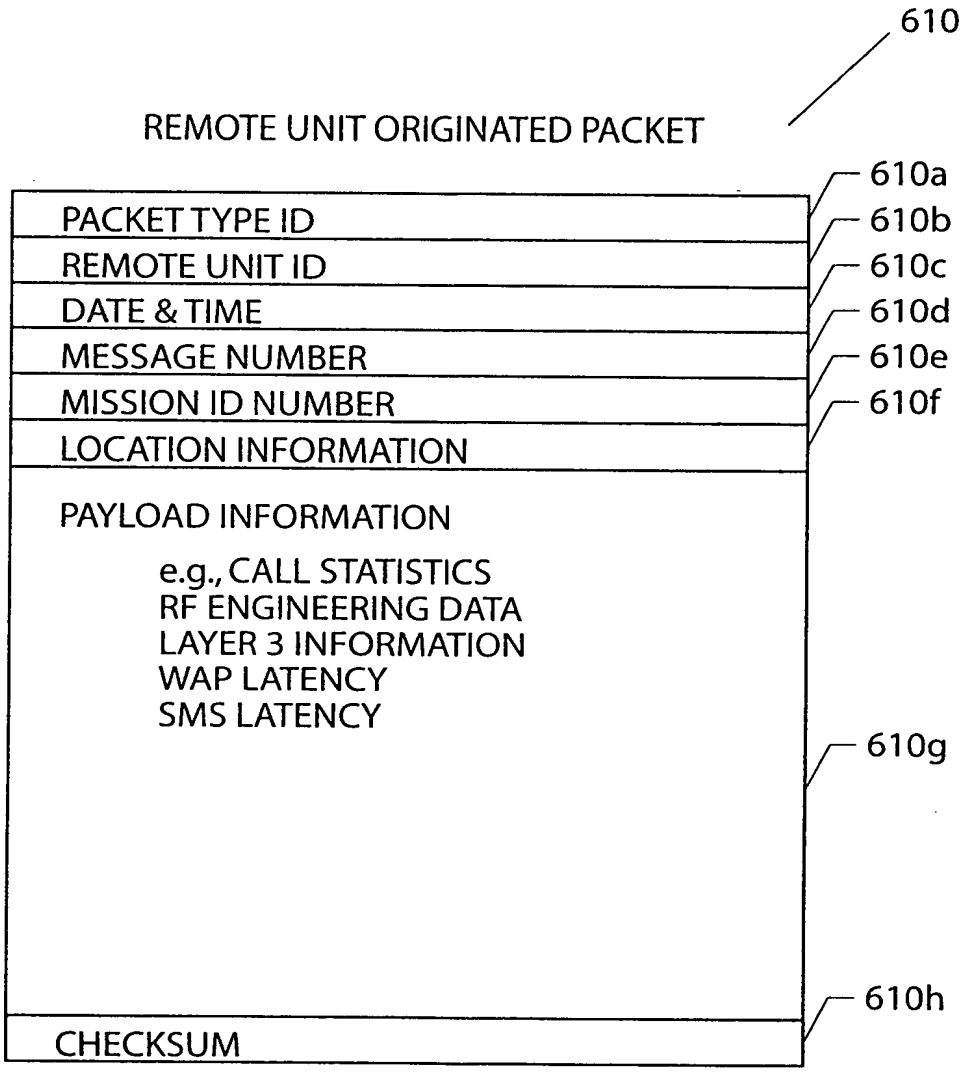

FIG. 6a

Docket No. 95-0076

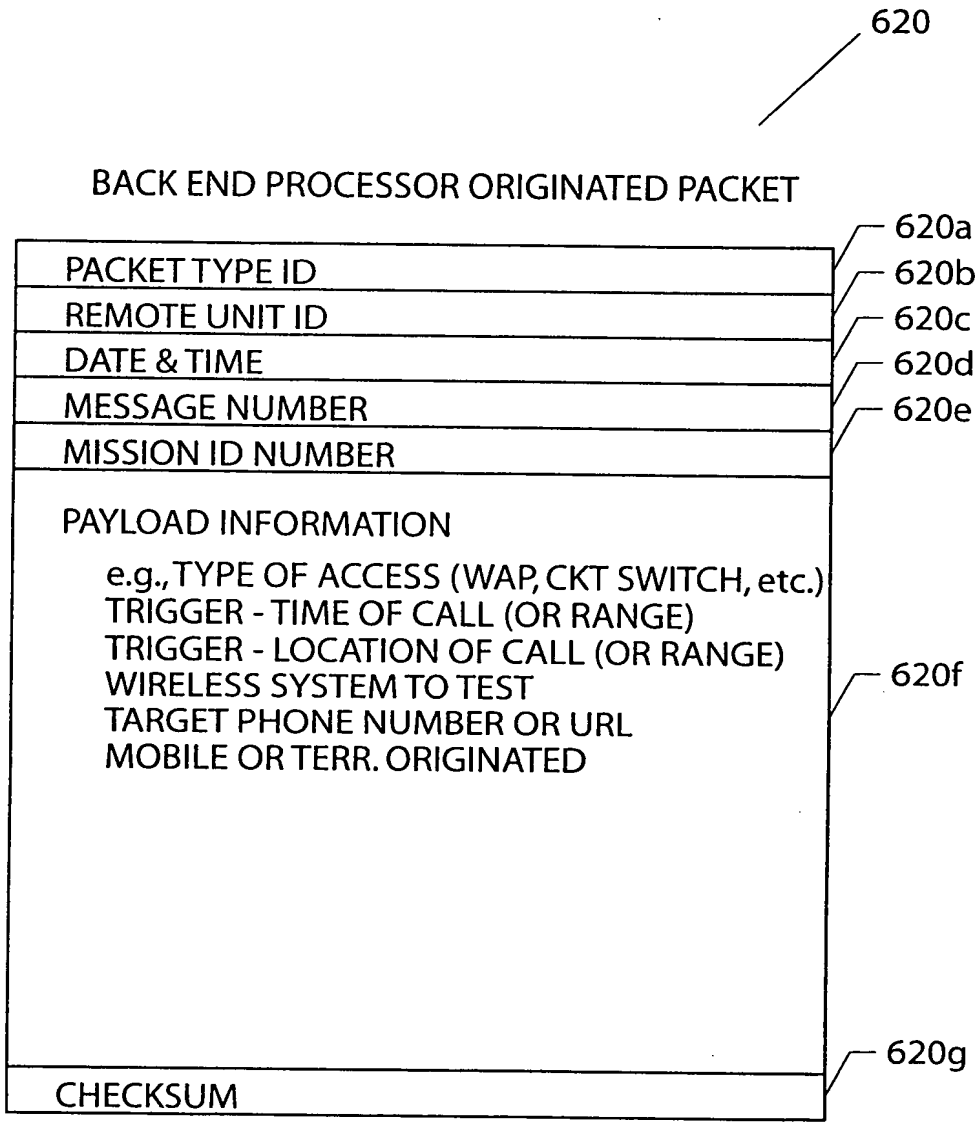

FIG. 6b

PCT/US2005/036950

EP0760504A1

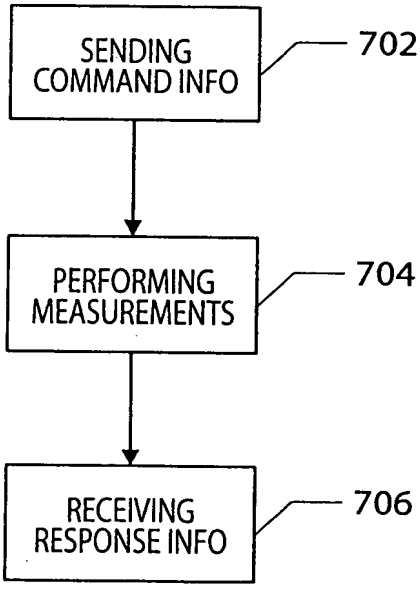

FIG. 7a

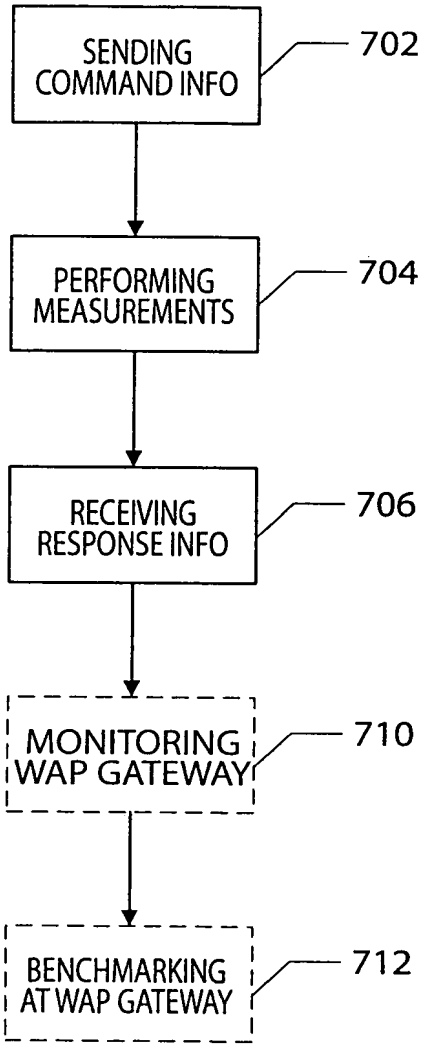

FIG. 7b

EP 0 967 765 A2

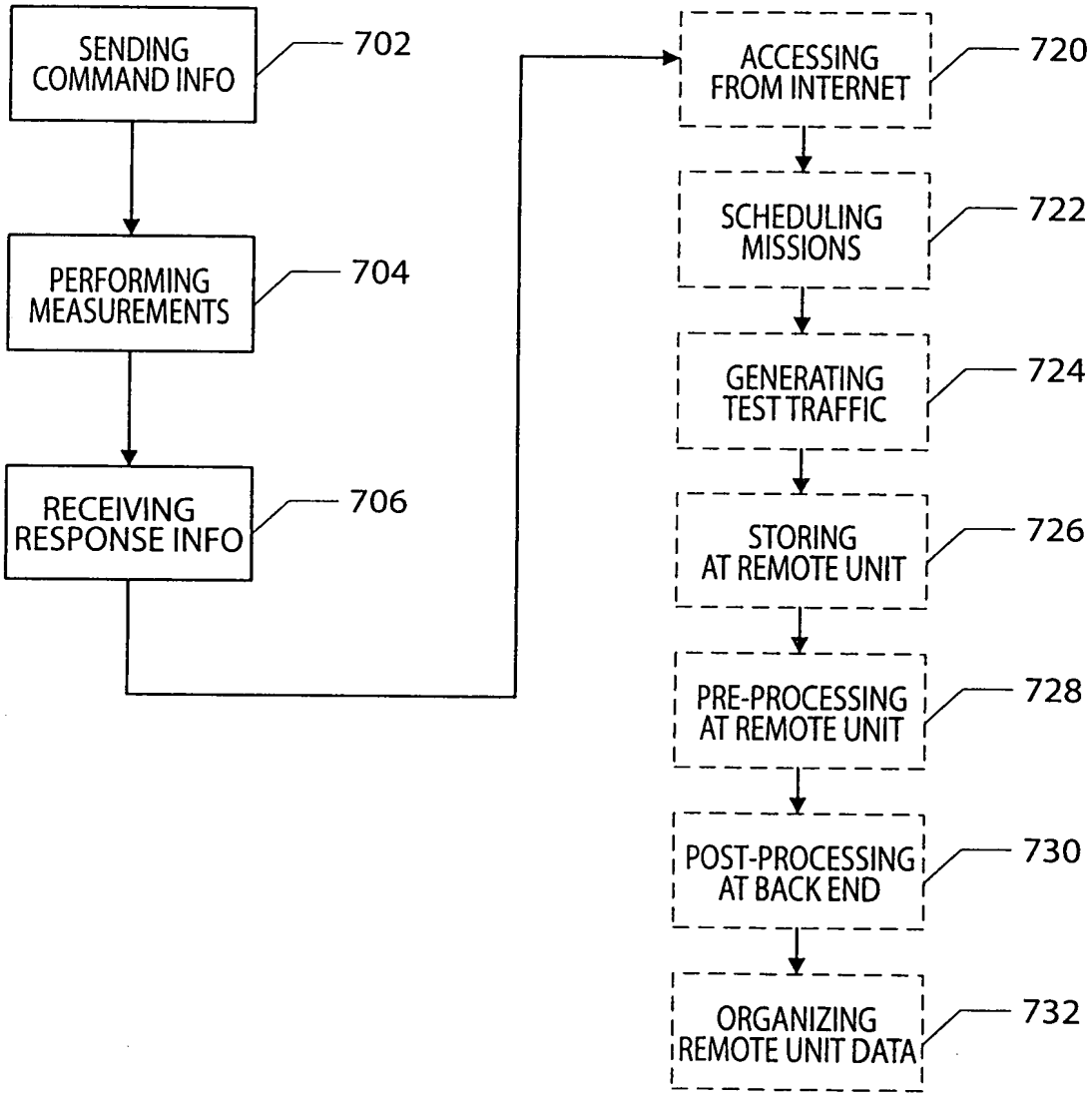

FIG. 7c

WO 2006/096854 PCT/US2006/008614

SERVICE: COMPARE PORTALS
REPORT: DOWNLOAD TIME
BY: CITY
BY: ALL CARRIERS
FREQUENCY: 15 MINUTES
TIME: 6 AM - 12 PM
PERIOD: 03/01/00 - 03/07/00
BENCHMARK: PORTAL INDEX
AOL.COM

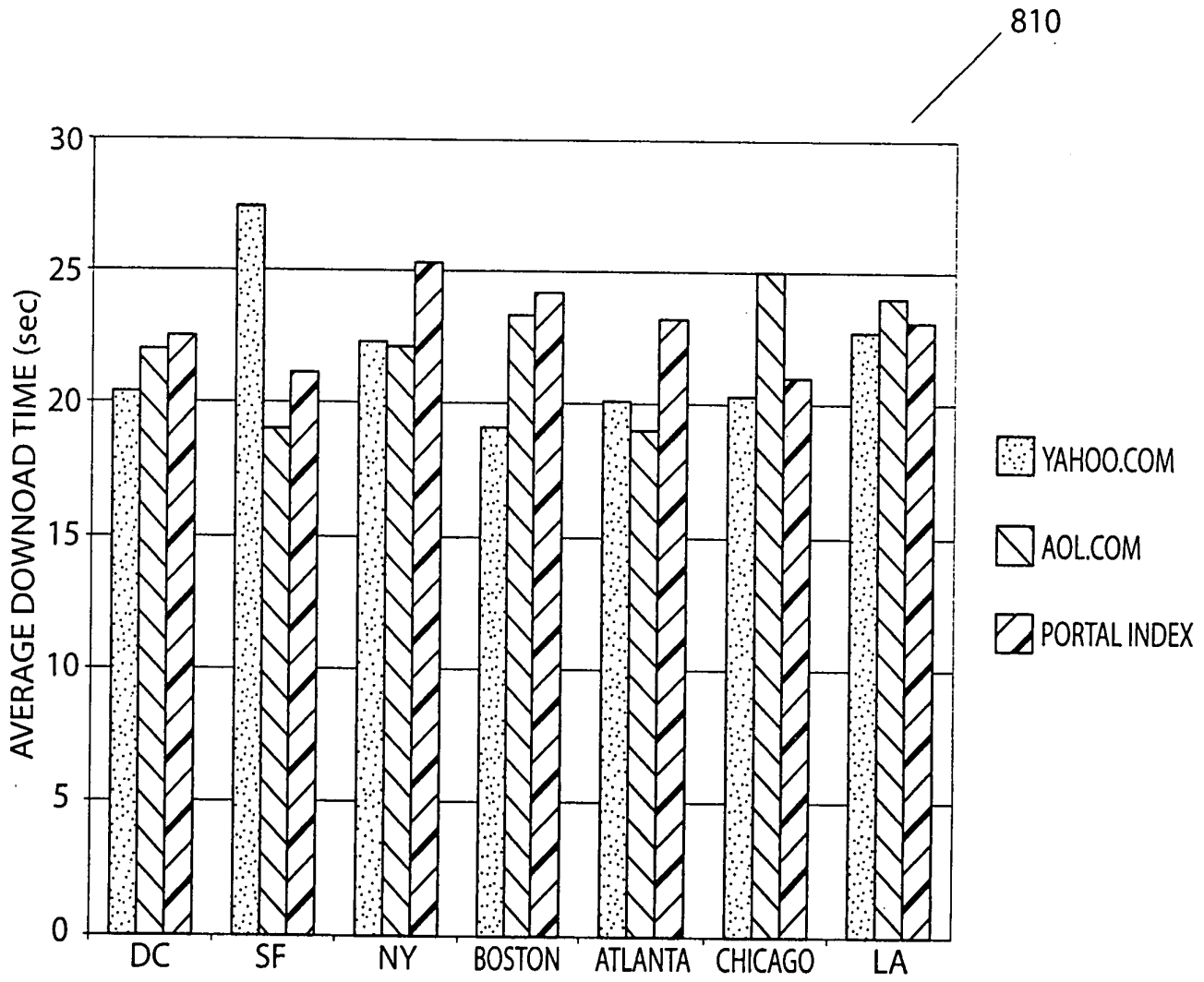

FIG. 8a

URL: YAHOO.COM
SERVICE: COMPARE WIRELESS OPERATORS
REPORT: DOWNLOAD TIME
BY: CITY
BY: CARRIER
FREQUENCY: 30 MINUTES
TIME: 6 AM - 9 PM
PERIOD: 03/01/00 - 03/07/00

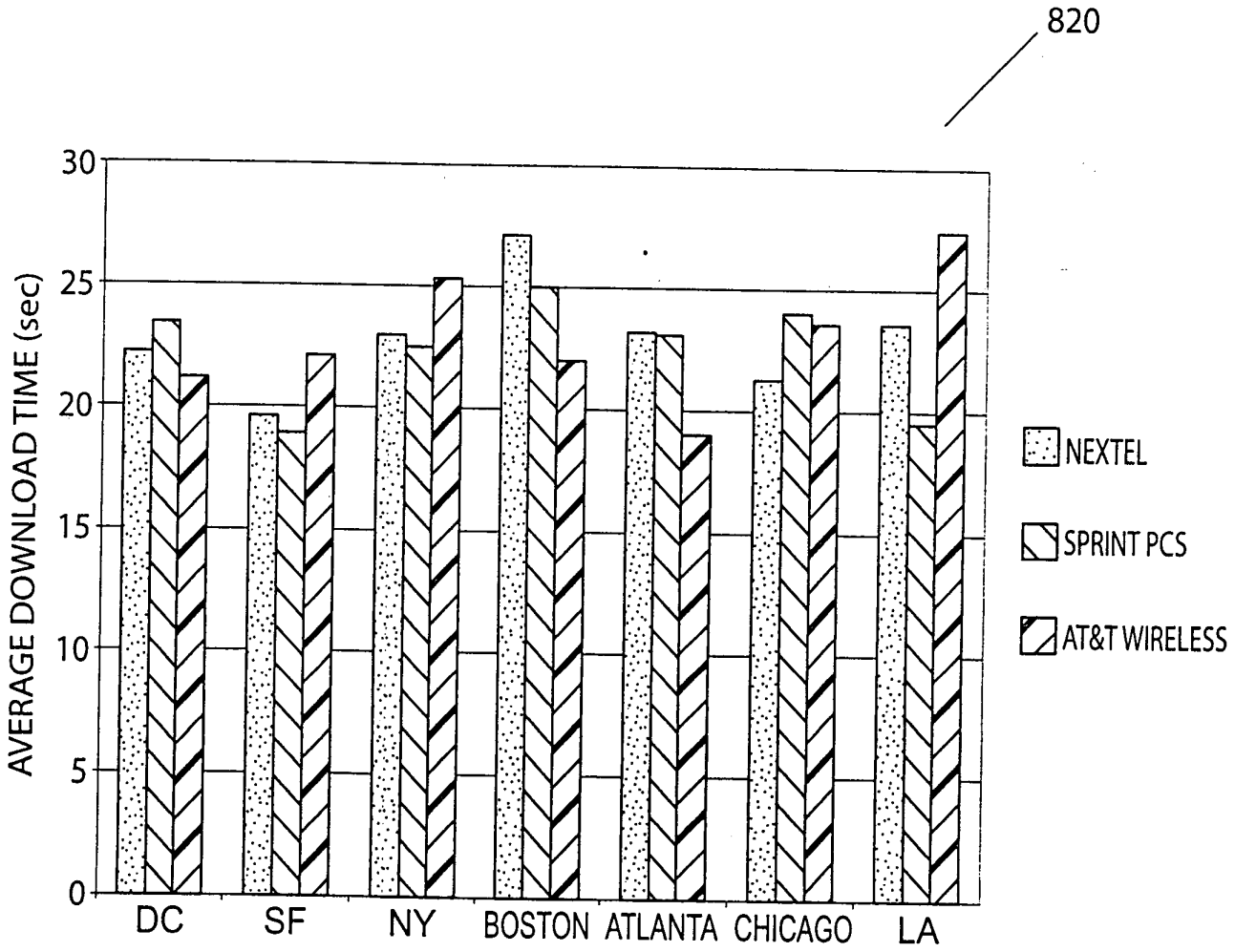

FIG. 8b

URL: YAHOO.COM
SERVICE: COMPARE WIRELESS OPERATORS
REPORT: COMPLETION PERCENT
BY: CITY
BY: CARRIER
FREQUENCY: 30 MINUTES
TIME: 6 AM - 9 PM
PERIOD: 03/01/00 - 03/07/00

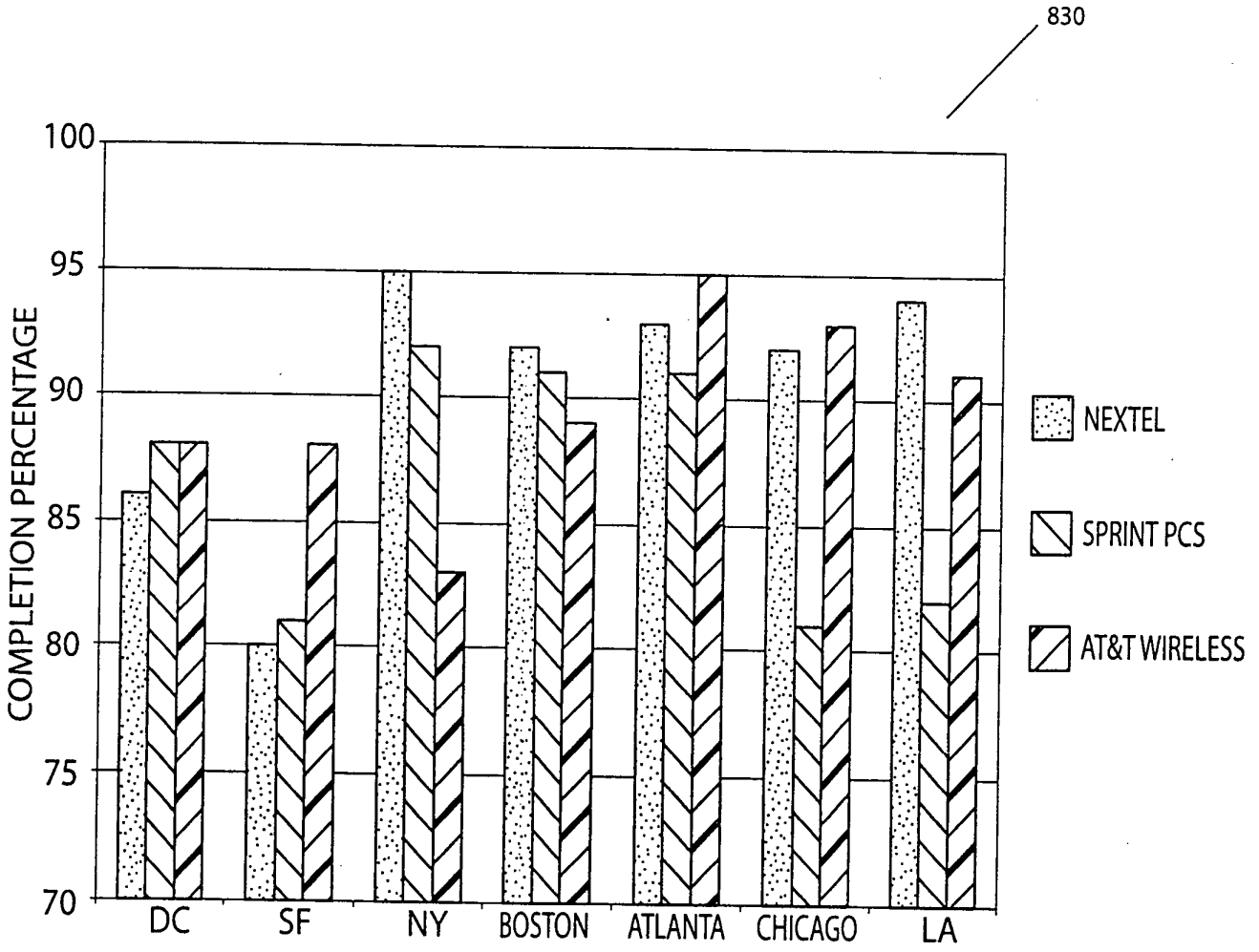

FIG. 8c

840

URL: YAHOO.COM
SERVICE: TREND WIRELESS OPERATORS
REPORT: COMPLETION PERCENT
BY: CITY
BY: CARRIER
FREQUENCY: 15 MINUTES
TIME: 6 AM - 9 PM
PERIOD: 03/01/00 - 03/07/00

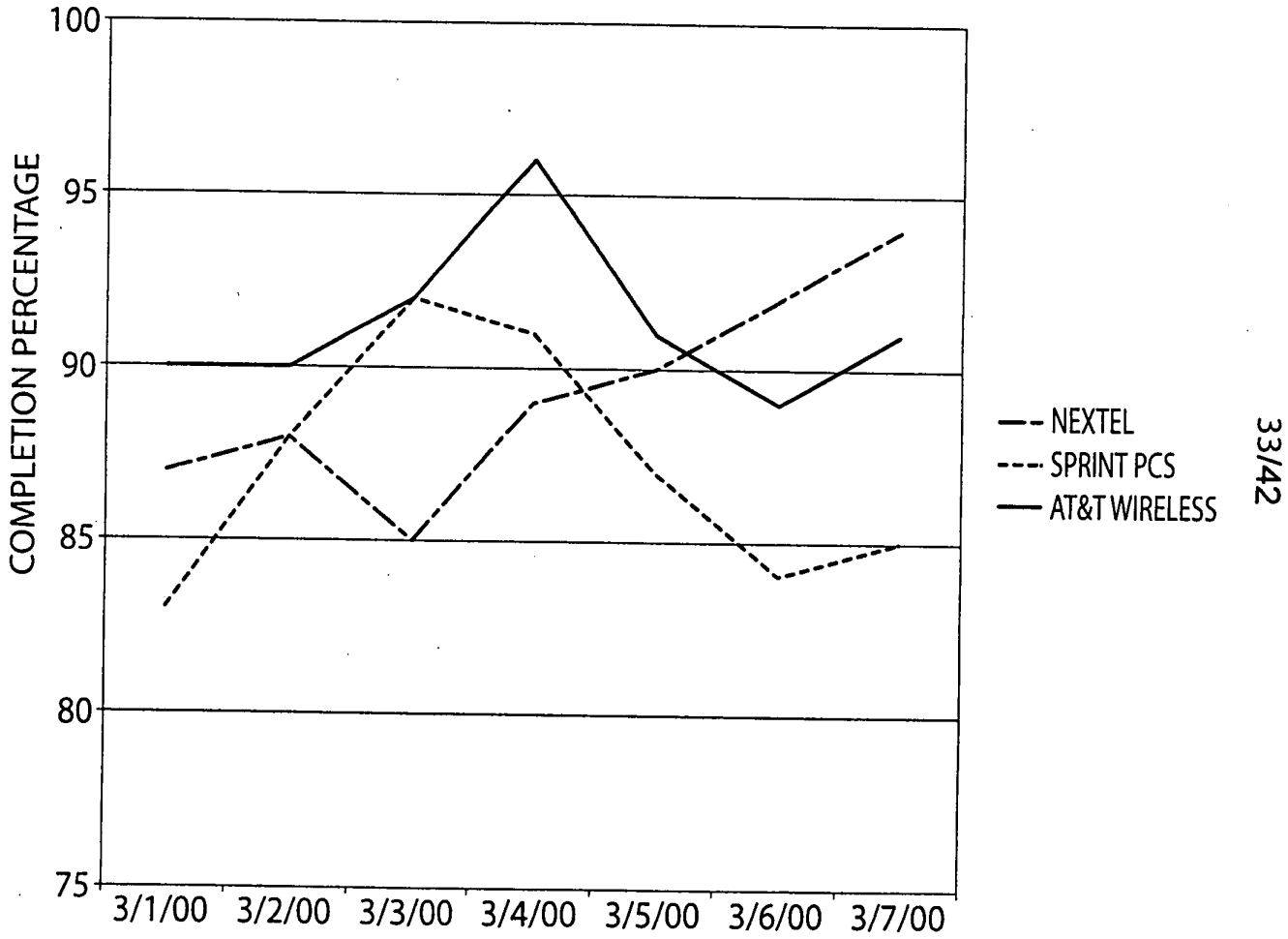

FIG. 8d

850

URL: YAHOO.COM
SERVICE: GATEWAY BREAKDOWN
REPORT: DOWNLOAD TIME COMPONENTS 1
BY: CITY
CARRIER:NEXTEL
FREQUENCY: 60 MINUTES
TIME: 12 PM - 12 PM
PERIOD: 03/01/00 - 03/07/00

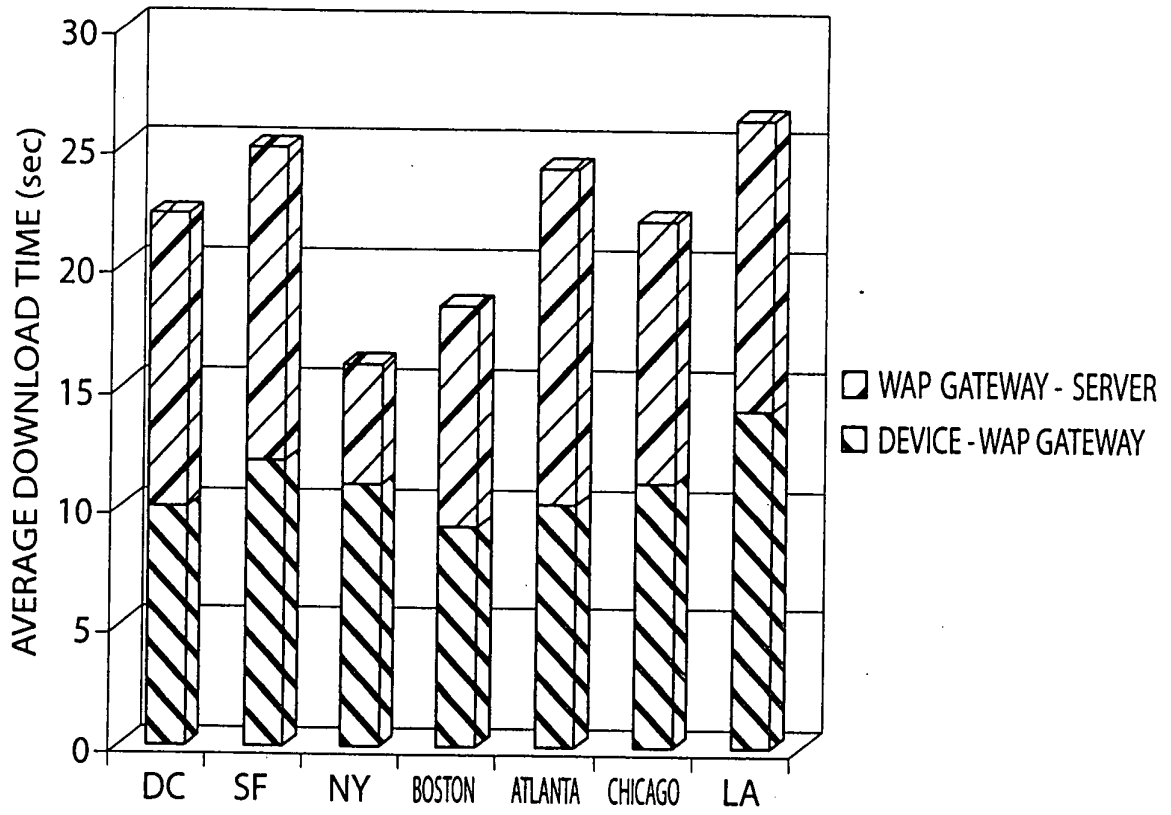

FIG. 8e

URL: YAHOO.COM
SERVICE: ERROR STATS
REPORT: ERROR REPORT
BY: ALL CITIES
CARRIER: ALL CARRIERS
FREQUENCY: 60 MINUTES
TIME: 12 PM - 12 PM
PERIOD: 03/01/00 - 03/07/00

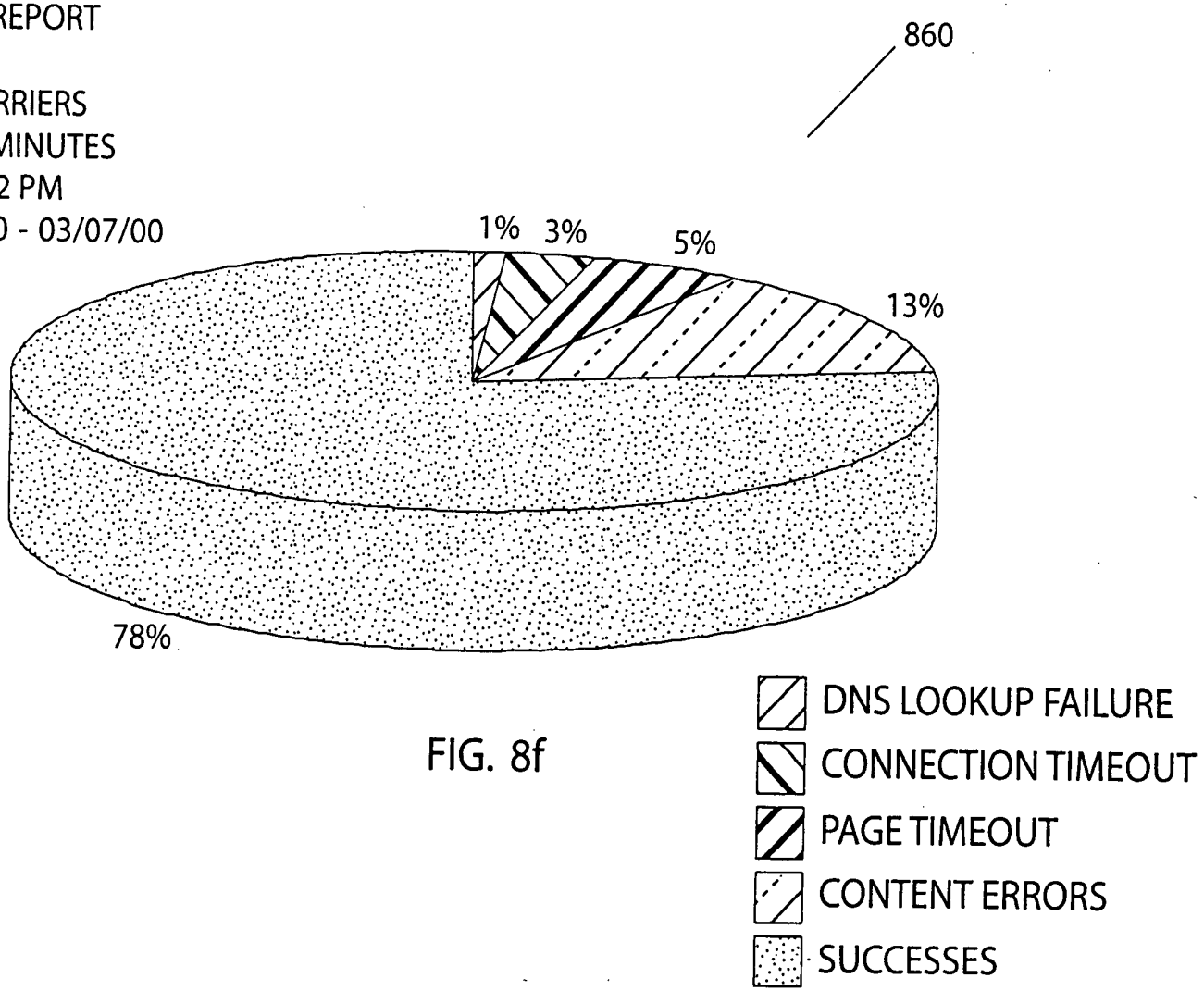

FIG. 8f

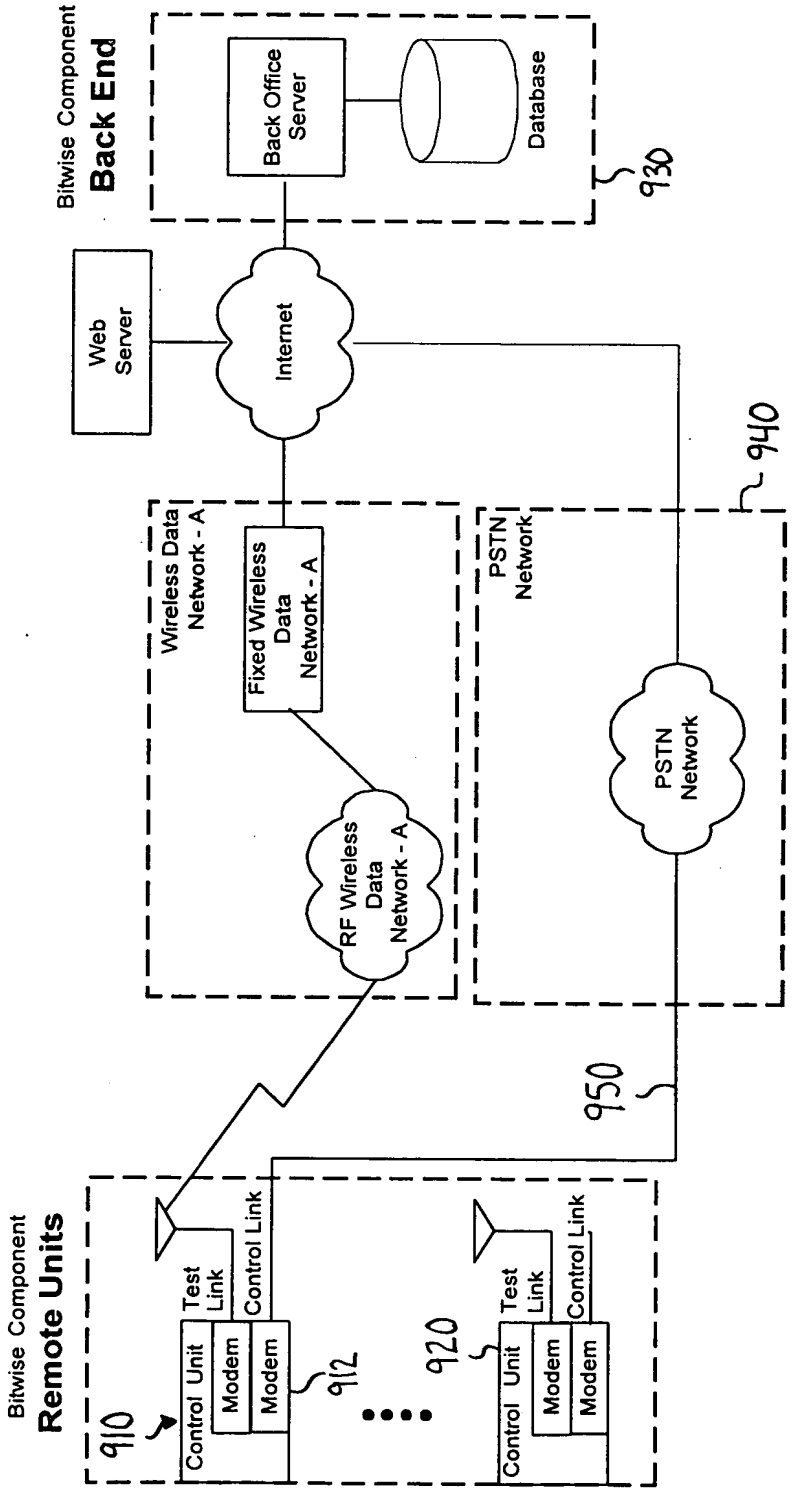
Bitwise Component
Back End
Back Office Server
Database
930
Web Server
Internet
940
Wireless Data Network - A
Fixed Wireless Data Network - A
RF Wireless Data Network - A
PSTN Network
PSTN Network
950
Bitwise Component
Remote Units
910
Control Unit
Test Link
Control Link
Modem
Modem
912
920
Control Unit
Test Link
Control Link
Modem
Modem

FIG. 9

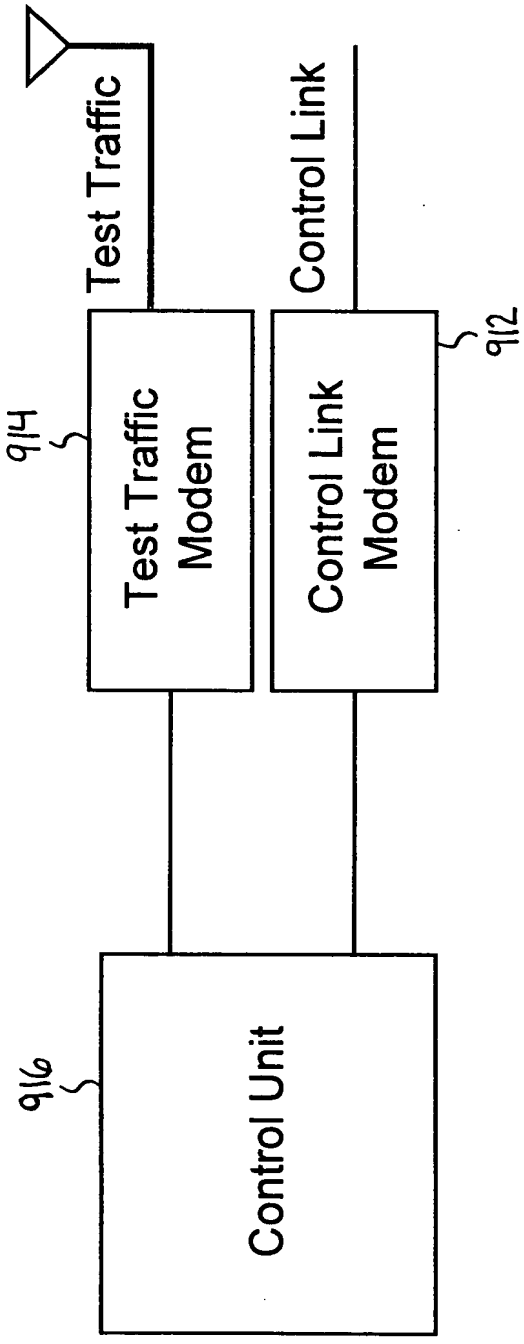

FIG. 10

T090270 "SS66860

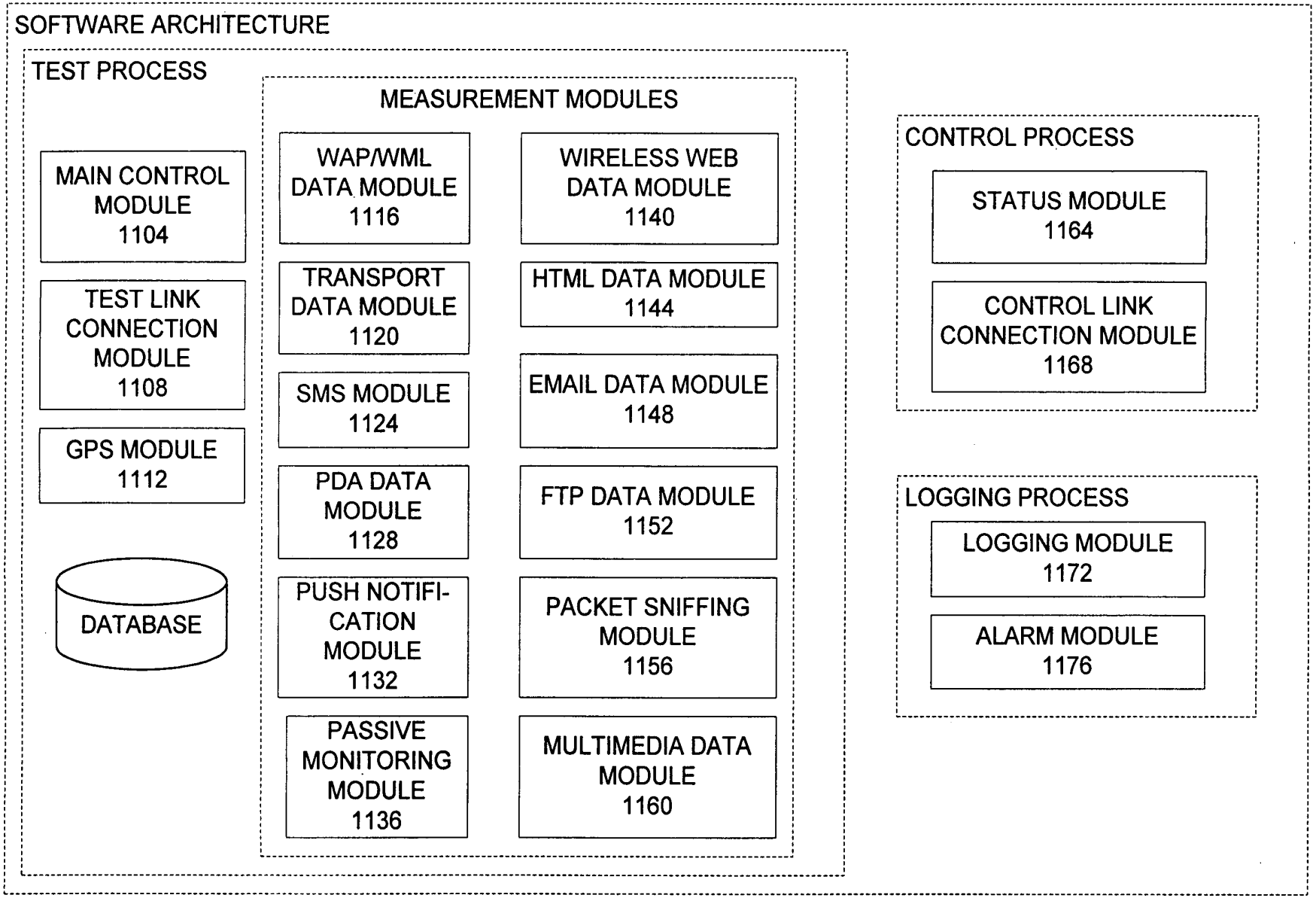
SOFTWARE ARCHITECTURE
TEST PROCESS
MAIN CONTROL MODULE 1104
TEST LINK CONNECTION MODULE 1108
GPS MODULE 1112
DATABASE
MEASUREMENT MODULES
WAP/WML DATA MODULE 1116
TRANSPORT DATA MODULE 1120
SMS MODULE 1124
PDA DATA MODULE 1128
PUSH NOTIFI-CATION MODULE 1132
PASSIVE MONITORING MODULE 1136
WIRELESS WEB DATA MODULE 1140
HTML DATA MODULE 1144
EMAIL DATA MODULE 1148
FTP DATA MODULE 1152
PACKET SNIFFING MODULE 1156
MULTIMEDIA DATA MODULE 1160
CONTROL PROCESS
STATUS MODULE 1164
CONTROL LINK CONNECTION MODULE 1168
LOGGING PROCESS
LOGGING MODULE 1172
ALARM MODULE 1176

FIG. 11

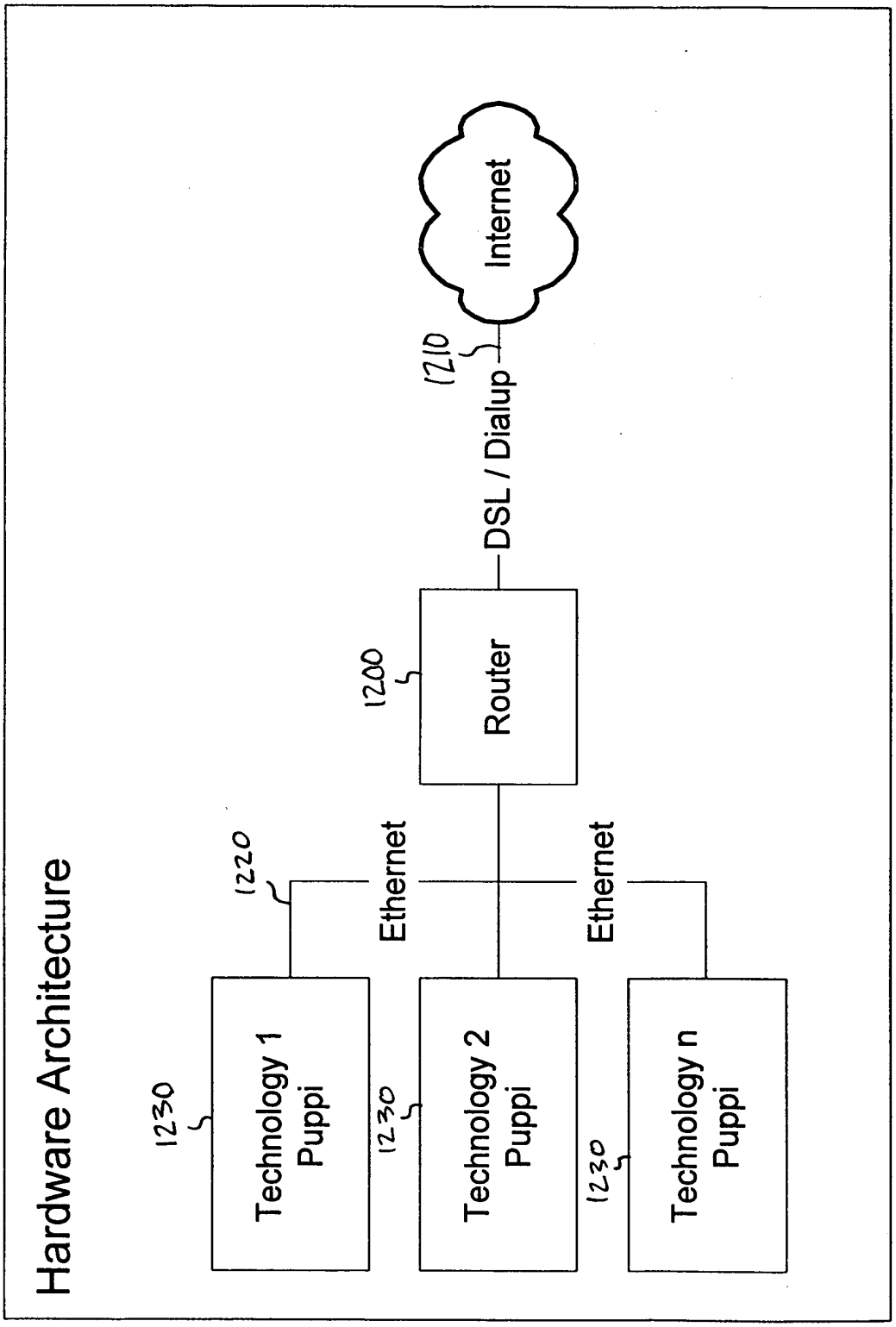
Hardware Architecture
Internet
1210
DSL / Dialup
1200
Router
Ethernet
Ethernet
1220
1230
Technology 1
Puppi
1230
Technology 2
Puppi
1230
Technology n
Puppi

FIG. 12

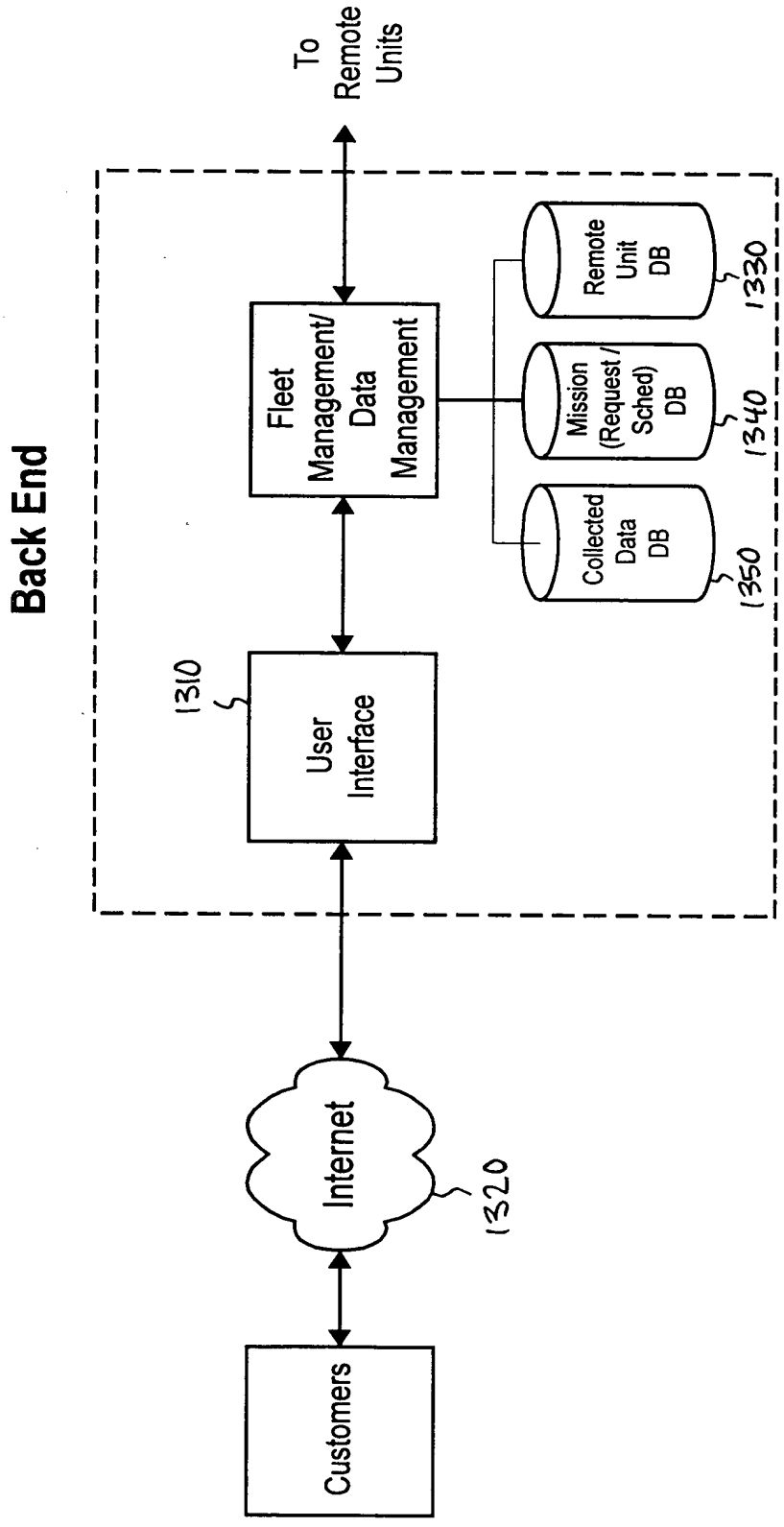
To Remote Units
Back End
Fleet Management/ Data Management
Remote Unit DB
1330
Mission (Request / Sched) DB
1340
Collected Data DB
1350
1310
User Interface
Internet
1320
Customers

FIG. 13

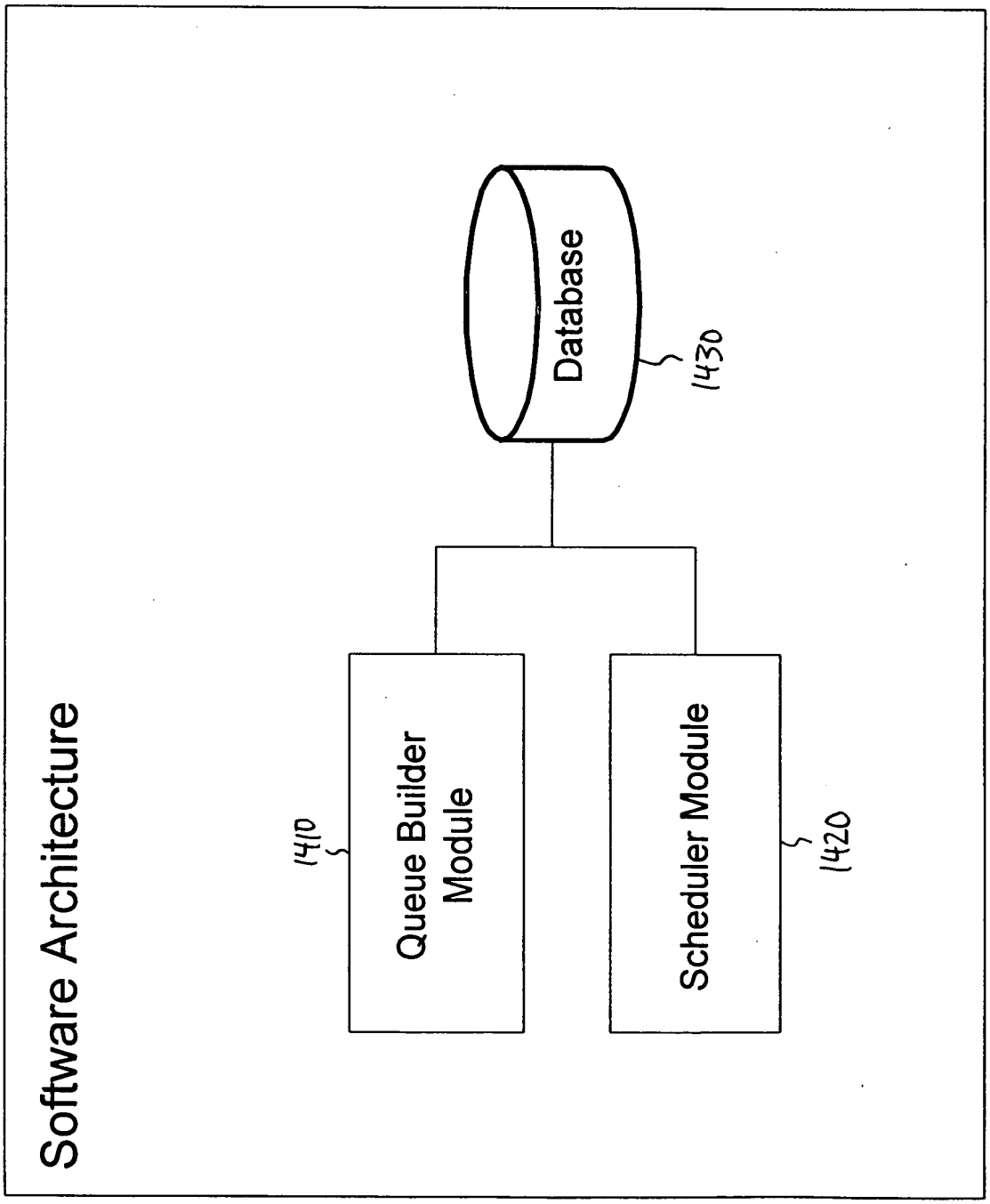

FIG. 14

Docket No. 56696

T090470" 55666660

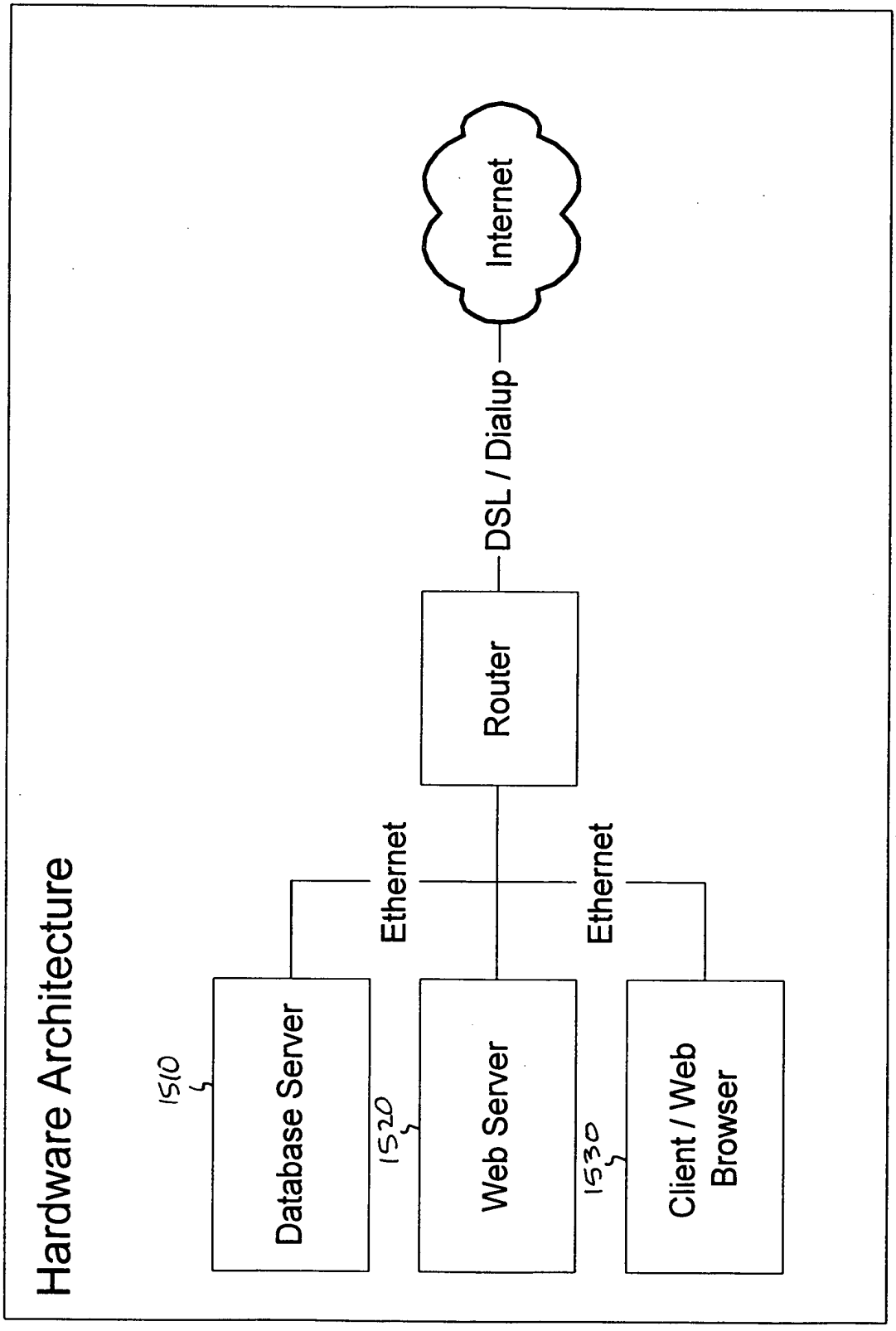

FIG. 15